

DUDLEY KNOX LIBRARY
NAVAL POSTGRADUATE SCHOOL
MONTEZUMA 101

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE December 1994	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE Adopting the Prime Vendor Program to Manage Marine Corps Authorized Medical/Dental Allowance Lists		5. FUNDING NUMBERS	
6. AUTHOR(S) White, Kevin L.			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000		8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.			
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.		12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) The purpose of this thesis is to analyze the ongoing problem of replacing expiring pharmaceutical and medical/surgical items stocked in Marine Corps Authorized Medical/Dental Allowance Lists (AMALs/ADALs). AMALs/ADALs allocated to the Fleet Marine Force are classified as Prepositioned War Reserve (PWR), required to be immediately available for combat support. Due to the short shelf-life of these items, maintaining this PWR creates excessive financial losses, costing the Marine Corps approximately eight million dollars per year. In February 1993, the Department of Defense implemented the Prime Vendor Program to eliminate excessive hospital inventories. This form of Just-in-Time inventory management improves the quality of health care by eliminating long procurement leadtimes and losses due to expirations and overstocking of pharmaceutical and medical/surgical supplies. This thesis analyzes the financial and logistical benefits that can be achieved by extending the Prime Vendor Program to include maintaining AMALs/ADALs. Our analysis shows that, by adopting the Prime Vendor Program, the Marine Corps could realize a potential savings of over \$4.5 million per year without reducing readiness.			
14. SUBJECT TERMS Pharmaceuticals, Authorized Medical Allowance List, AMAL, Prepositioned War Reserves, PWR, Prime Vendor, Prime Vendor Program		15. NUMBER OF PAGES 98	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)

Prescribed by ANSI Std. Z39-18 298-102

Approved for public release; distribution is unlimited.

**ADOPTING THE PRIME VENDOR PROGRAM TO MANAGE MARINE
CORPS AUTHORIZED MEDICAL/DENTAL ALLOWANCE LISTS**

by

Kevin L. White
Captain, United States Marine Corps
B.S., United States Naval Academy, 1985

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1994



10513
W55265
C.1

ABSTRACT

The purpose of this thesis is to analyze the ongoing problem of replacing expiring pharmaceutical and medical/surgical items stocked in Marine Corps Authorized Medical/Dental Allowance Lists (AMALs/ADALs). AMALs/ADALs allocated to the Fleet Marine Force are classified as Prepositioned War Reserve (PWR), required to be immediately available for combat support. Due to the short shelf-life of these items, maintaining this PWR creates excessive financial losses, costing the Marine Corps approximately eight million dollars per year. In February 1993, the Department of Defense implemented the Prime Vendor Program to eliminate excessive hospital inventories. This form of Just-in-Time inventory management improves the quality of health care by eliminating long procurement leadtimes and losses due to expirations and overstocking of pharmaceutical and medical/surgical supplies. This thesis analyzes the financial and logistical benefits that can be achieved by extending the Prime Vendor Program to include maintaining AMALs/ADALs. Our analysis shows that, by adopting the Prime Vendor Program, the Marine Corps could realize a potential savings of over \$4.5 million per year without reducing readiness.

TABLE OF CONTENTS

I. INTRODUCTION	1
A. BACKGROUND	1
B. OBJECTIVE OF THE RESEARCH	2
C. RESEARCH QUESTIONS	3
D. SCOPE AND LIMITATIONS	4
E. CURRENT MEDICAL LOGISTIC PRACTICES	4
F. ORGANIZATION OF THE THESIS	6
II. PRIME VENDOR PROGRAM OVERVIEW	9
A. MEDICAL LOGISTICS BEFORE THE PRIME VENDOR PROGRAM	9
B. MEDICAL LOGISTICS UNDER THE PRIME VENDOR PROGRAM	12
C. PRIME VENDOR SELECTION	16
D. THE PRIME VENDOR CONTRACT	17
E. CONCEPT OF OPERATION	18
F. ADVANTAGES OF THE PRIME VENDOR PROGRAM	20
1. Reduction in Procurement/Delivery Costs	21
2. Total Visibility of Demands	21
3. Standardized Inventories/Formularies	22
4. Best Available Shelf Life	22
5. Labor Reductions	23
6. Faster Delivery Time	23

G. DISADVANTAGES OF THE PRIME VENDOR PROGRAM . . .	24
1. Less Stock Available for Emergency Use	24
2. Reduction of the Retail Training Base	25
III. THE CHANGING ENVIRONMENT	27
A. GLOBAL CHALLENGES	27
1. Resumption of a Global Threat	28
2. Large Scale Regional Conflicts	29
3. Peace Enforcement/Peace Keeping Missions	32
4. Humanitarian Relief Missions	33
B. DOMESTIC CHALLENGES	35
1. The Budget	35
2. Strategic Lift	38
a. Sealift	39
b. Airlift	40
c. Land-Based Prepositioning	42
d. Afloat Prepositioning	43
3. Environmental Concerns	44
4. The Industrial Base	45
IV. PROPOSED ALTERNATIVES	47
A. MAINTAIN THE STATUS QUO	48
1. MEF 60 Days of Supply	48
2. Maritime Prepositioning Force	50
3. Norway Air Landed MEB (NALMEB)	51

B. PRIME VENDOR VERSUS CURRENT SYSTEM	52
1. Standard Prime Vendor Contract	52
a. Overhead Savings	52
b. Maximum Shelf-Life Savings	53
c. Bar Code Technology Savings	53
2. Prime Vendor Program with Return-for-Credit	54
C. CONSOLIDATION OF MEDICAL LOGISTICS	55
1. The Value of Consolidation	55
2. Better Asset Visibility	56
3. Meeting Deployment Requirements	57
D. REDUCING CURRENT REQUIREMENTS TO 30 DAYS OF SUPPLY	58
1. Maintaining Crisis Response Capability	58
2. Maintaining the MedLog Infrastructure	59
E. COMPLETE RELIANCE ON PRIME VENDOR SUPPORT	60
1. Eliminating AMAL Reserves	60
2. Maintaining Military Unique Items	61
3. Maintaining the MedLog Infrastructure	61
F. CONTRACTS WITH COMMERCIAL VENDORS	62
G. CONCLUSIONS	63
V. CONCLUSIONS AND RECOMMENDATIONS	65
A. CONCLUSIONS	65

B. RECOMMENDATIONS	66
1. Adopt the Prime Vendor Program	66
2. Reduce AMAL Requirements	67
a. Meeting Mount-Out Requirements	68
b. Maintaining MedLog Training Base	69
3. Increase MPF Minimum Shelf-Life Standard	69
C. RECOMMENDATIONS FOR FURTHER STUDY	70
1. Military Unique Items	70
2. Eliminate Medical Logistics Companies	70
 APPENDIX A. AUTHORIZED MEDICAL/DENTAL ALLOWANCE LIST	 73
 APPENDIX B. MARITIME PREPOSITIONING FORCE COMPOSITION	 77
 APPENDIX C. PRIME VENDOR SUPPORTED MEDICAL SUPPLIES . .	79
 APPENDIX D. GLOSSARY	81
 LIST OF REFERENCES	83
 INITIAL DISTRIBUTION LIST	88

I. INTRODUCTION

A. BACKGROUND

With declining Department of Defense (DoD) budgets and government contractual reform, the military must take action to reduce unnecessary expenditures and increase efficiency, while maintaining the equipment, personnel and supplies necessary to meet potential threats anywhere in the world. Amongst the myriad of Prepositioned War Reserve (PWR) materiel are the perishable pharmaceutical and medical/surgical supplies considered essential for the treatment and care of those injured in military action. These dated and deteriorative supplies are acquired, held, and maintained only to meet war reserve materiel requirements in accordance with instructions contained in various instructions, orders and directives. These items, referred to as Authorized Medical Allowance Lists (AMALs) in the Naval Service, represent the minimum that must be available to support combat operations for a specified time period. However, since they are maintained for use only as a contingency, many items in the AMALs are disposed of each year, at significant financial loss, because they have reached their maximum shelf life.

The Medical Logistics Company is the organization tasked with maintaining AMALs for a Marine Expeditionary Force (MEF). Currently, the Marine Corps is organized into three standing MEFs: I MEF on the West Coast, II MEF on the East Coast, and III MEF in Okinawa. A MEF is normally deployed with 60 days of supply (DOS) for all necessary logistics support, including medical supplies. Current policy is to maintain the entire 60-day supply of AMALs for immediate deployment. In I MEF alone, this requirement costs the Marine Corps over two million dollars annually.

B. OBJECTIVE OF THE RESEARCH

Emphasizing its status as the nation's "Force-in-Readiness," the Marine Corps has built a reputation for being "first to fight." "With its emphasis on rapid response to regional crises, the national military strategy places a premium on the expeditionary capabilities of the Marine Corps..." (CJCS, Feb 1993) They have gained this reputation by adopting a philosophy of maintaining the necessary prepositioned war reserves to independently deploy each MEF.

This philosophy, applied at the Medical Logistics Company level, requires maintaining each MEF's 60-day supply of pharmaceutical and medical/surgical supplies. The trouble with maintaining these consumable AMALs, given their dated and deteriorative nature, is their limited shelf-life. This shelf-life limitation creates a need for each Medical Logistics Company to dispose of expired supplies and replenish with new stock. Roughly one-third of the inventory is replaced each year. (Aguigam, 1991) In a time when "defense spending as a share of our total national resources is near its lowest point in 40 years" (USMC, 1994), this type of inventory system can easily be targeted as a waste of precious financial resources.

A December 1991 Government Accounting Office (GAO) report criticized the Department of Defense's medical inventory and contracting practices. The GAO recommended applying commercial inventory management practices to military medical facilities. In response to this report, the services instituted a "Prime Vendor Program" to provide pharmaceutical and medical/surgical supplies to their Military Treatment Facilities (MTFs). Dividing the nation into 22 geographic regions, separate contracts are awarded for pharmaceutical supplies and medical/surgical supplies. Within each region, each MTF receives all of its respective supplies from one vendor. As a result of the Prime Vendor Program,

MTFs have reduced stock levels, manpower expense, and loss due to expired shelf life item disposal. Additionally, the electronic ordering system used by the Prime Vendors has resulted in faster order processing. "The Prime Vendor Program has been identified as having favorable impact on the efficiency and effectiveness of the Medical Logistics community." (DISA, 1994)

The objective of this research is to investigate the potential of adopting the Prime Vendor Program to support Marine Corps AMALs/ADALs without reducing readiness. As such, the first step is to identify whether the Prime Vendor Program can provide significant financial savings for the Marine Corps' PWR program. Maintaining the dated and deteriorative AMAL/ADAL pharmaceutical and medical/surgical supplies is an expensive endeavor. However, since the total amount of PWR is distributed throughout three MEFs and two prepositioning programs, the total cost of this program is inconspicuous. Before the Marine Corps can trust the lives of its personnel to a new business practice, the responsiveness of this new program, and the pharmaceutical and medical/surgical supply industry itself must be analyzed.

C. RESEARCH QUESTIONS

Based on the aforementioned objectives, this thesis addresses these specific questions:

1. Can the Prime Vendor Program provide financial savings for maintaining Marine Corps Authorized Medical/Dental Allowance Lists.
2. What is the current total cost to the Marine Corps to maintain dated and deteriorative pharmaceutical and medical/surgical supplies in PWR?
3. Is the Prime Vendor Program responsive enough to deliver necessary supplies during the contingency build-up and subsequent resupply period without reducing readiness?

D. SCOPE AND LIMITATIONS

This thesis focuses on the current Prime Vendor Program as used in Military Treatment Facilities and analyzes its potential for use by Marine Corps Medical Logistics Companies. Although the research focused on the 1st Medical Logistics Company in Camp Pendleton, California, similar financial loss is being experienced by the two other Medical Logistics Companies as well as the Marine Corps' Maritime Prepositioning Force and Norway Airlanded MEB program. By comparing the total costs required to maintain current purchasing and inventory practices with that of the Prime Vendor Program, we hope to show that by incorporating the Prime Vendor Program, the Marine Corps will significantly reduce the cost of maintaining PWR pharmaceutical and medical/surgical supplies.

The Prime Vendor Program was initiated in January 1993 with the first contract awarded strictly for pharmaceutical supplies. The first contracts dealing with medical/surgical supplies have only recently been awarded and, as such, the necessary information needed to evaluate anticipated savings in this area are unavailable. It is assumed that equivalent savings will result through the new Prime Vendor Program medical/surgical contracts as has been experienced through the pharmaceuticals contracts.

E. CURRENT MEDICAL LOGISTIC PRACTICES

A Medical Logistics (MedLog) Company, under the direction and guidance of the Commanding Officer of Supply Battalion, Force Service Support Group, is tasked with providing for the receipt, storage and issue of Class VIII (medical/dental) supplies and equipment in support of the Authorized Medical/Dental Allowance List (AMAL/ADAL) of medical/dental units and elements. AMAL/ADALs are warehoused in modular form to facilitate rapid mountout and resupply response. Each module contain equipment or consumables

necessary to perform a specific health care function under combat/deployed conditions. Consumable materials contained in the AMAL/ADALs comprise the necessary materiel to support a predetermined patient care load associated with a specific health care function. This patient care load is based on the worst case scenario of one MEF incurring 8,381 battle casualties from D-day to D+60. Due to limited warehouse space and the manpower-intensive nature of AMAL/ADAL management, a minimum of 25 percent of the consumable supplies are kept in modular form. The remainder of the MEF's 60-day supply is maintained by the MedLog company in bulk storage for subsequent deployment to the theater of operations. The 60 DOS requirement is based on the estimated time needed to support the MEF until normal replenishment methods can be established in the theater of operations. Unlike other forms of supply, where the 60 DOS starts when the unit deploys from its base, the 60 DOS inherent in AMALs/ADALs start when actual combat operations begin.

MedLog companies currently obtain their supplies through the Supported Activities Supply System (SASSY) Management Unit (SMU). (Note: The SMU provides centralized supply control and management for the entire MEF, accounting for virtually all classes of supply). MedLog companies manage these supplies until they're issued to units for training or contingency operations. Since pharmaceutical items with less than 12 months of remaining shelf life are considered non-deployable, when these supplies near the end of their shelf-life MedLog companies attempt redistribution to other users. Expired drugs are disposed of through Pine Bluff Arsenal or the Defense Reutilization and Marketing Office (DRMO). Most of the pharmaceuticals stocked by MedLog companies are ordered by the Defense Logistics Agency (DLA) through the Defense Personnel Support Center (DPSC). Annual reviews are conducted to ensure materials with

less than 12 months of shelf-life remaining are pulled from the AMAL blocks for disposition or disposal.

Tracking these items is a labor intensive process and two million dollars worth of pharmaceuticals await disposition every year. If MedLog can not issue or redistribute the stock to other Military Treatment Facilities (MTFs) or Navy and Marine Corps units, there is financial loss. (Aguigam, 1991)

The tracking system becomes even more complicated once the pharmaceuticals are placed into the AMAL blocks, requiring inventory personnel to open each block and inspect each item. To combat this time-intensive process, 1st MedLog Company recently began stocking dated material separate from their modular AMAL/ADAL blocks for easier access. The material is now maintained with like material in a central location, to be returned to their respective AMAL/ADALs when required for issue. By making this material more accessible, personnel spend less time conducting periodic inventory maintenance and review, without reducing readiness.

F. ORGANIZATION OF THE THESIS

This chapter provided a background of problems related to pharmaceutical and medical/surgical supplies in the Marine Corps' PWR program, including a review of the immense responsibility of one of the organizations charged with maintaining these supplies. The following chapter focuses on the Prime Vendor Program, DoD's successful solution to reducing pharmaceutical costs. Chapter III analyzes global challenges affecting the demand for medical PWR and domestic issues forcing changes to current requirements. Chapter IV discusses proposed alternatives that are currently available to the Marine Corps, comparing trade-offs and cost-benefits of the current system versus the increased customer response of

Prime Vendor Program. Chapter V offers conclusions and recommendations, as well as suggesting recommendations for further study.

II. PRIME VENDOR PROGRAM OVERVIEW

This chapter examines the DoD's Prime Vendor Program and the cost savings impact it has accomplished at Military Treatment Facilities (MTFs). The Prime Vendor Program has successfully reduced the MTF's delivered costs of medical supplies while improving their customer support.

A. MEDICAL LOGISTICS BEFORE THE PRIME VENDOR PROGRAM

Prior to Prime Vendor Program initiation, the DoD medical logistics system consisted of wholesale and retail operations. The Defense Logistics Agency (DLA) managed the wholesale function through the Medical Directorate of the Defense Personnel Support Center (DPSC) and the DLA Depot system. DPSC purchased large quantities of medical consumables, stored them in depots and issued them as needed to medical units and facilities. DLA "provides approximately 50 percent of the supplies used by medical facilities in the continental United States and most of the supplies used by overseas facilities." (GAO, 1991) Contracting for these supplies provided DLA with quantity discounts which, after attaching a surcharge to cover overhead, were passed on to their customers. Prices for these items were published on Federal Supply Schedules (FSS). DLA negotiated the prices with manufacturers and distributors through competitive bidding, thus insuring the best possible price for the government. DLA's surcharge added 20 percent to the cost of the total purchase order.

The military treatment facility (MTF) ordered supplies from the depots, using priorities established under the Uniform Material Movement and Issue Priority System (UMMIPS). Highest priority items, those needed within seven days, were ordered using "Priority 3" ("2" for a deployed medical activity, and

"1" for a combat zone facility). For those items that were needed in 15 days or less, "Priority 6" was used ("5" for deployed, "4" for combat zone). The lowest urgency was "Priority 13," which gave the system 31 days to get the item to the ordering facility. (MCO 4400.16G) One of the fundamental problems with this system, the major reason for MTFs holding excessive inventory, was that turnaround times for anything less than Priority 3 were twice these established rates. MTFs typically maintained "unofficial" inventories because they lacked confidence in supplies being available when needed. Thus a greater amount of "safety stock" was stored than demand warranted. Additionally it was difficult to accurately calculate on-hand balances, usage rates, and reorder points due to inaccurate information, often resulting in inventory levels equivalent to a six months' supply or more.

For the MTF's additional pharmaceutical needs, retail procedures similar to those used by civilian hospitals were available. That is, if an item was not available from DPSC, or the turnaround time was unacceptable, the MTF established individual purchase procedures with manufacturers and wholesalers, or purchased material from local commercial sources. (Clayton, 1993) Purchasing from local vendors, referred to as an "open purchase," was a complicated process requiring excessive paperwork and official approval to insure a fair price and proper business practices were followed. Figure 2-1 illustrates the system DoD used prior to institution of the Prime Vendor Program.



Figure 2-1. DoD Medical Logistics System prior to the Prime Vendor Program

DLA's medical materiel inventories also serve as prepositioned war reserve stocks. These stocks are funded by the individual services but are owned and stored by the DLA. The Defense Personnel Support Center (DPSC), a subcommand of DLA, manages these stocks. The PWR stocks are those required to be on hand to support initial contingency requirements until a "surge" in industrial production can meet wartime consumption demands.

...surge is the first acceleration of production from peacetime rates to something 50 to 200 percent higher and is required for small wars or ambiguous situations ... and ... surge entails having industry increase production in response to higher orders, and make efforts to reduce lead times but without having to disrupt its commercial work. (Libicki, 1988)

Under surge conditions, the responsiveness of the pharmaceutical industry is estimated to be three to six months. As such, to meet the worst case scenario, DLA/DPSC maintains enough medical consumables to support the first 180 days of combat (Cuddy, et al. 1988). In the case of the Marine Corps, as the 60 days of PWR are expended, the remaining 120 days of stock would be requisitioned

from DLA/DPSC stocks. "Based on this method of support, capability was measured in terms of inventory levels." (DoD, 1994)

B. MEDICAL LOGISTICS UNDER THE PRIME VENDOR PROGRAM

In January 1993, the DoD awarded a five year, \$100 million contract to the McKesson Corporation to supply prescription drugs to Defense Department hospitals. This contract, "the first contract under a new system under which the department will select prime pharmaceutical vendors to regionally supply military hospitals," covered 11 hospitals near the Washington D.C. area. (Wall Street Journal, 1993) This new system, called the Prime Vendor Program, was the first large-scale effort to drive down the costs of distributing medical supplies.

The Prime Vendor Program is the medical community's contribution toward improving DoD buying practices. The 1980s were full of headlines reporting excess inventories far exceeding requirements of peacetime or wartime operations. In 1985, President Reagan's Blue Ribbon Commission on Defense Management, known as the Packard Commission (from its chairman Senator David Packard), studied defense management policies. The Packard commission recommended, among many other important changes, better use of the country's "technological and industrial capabilities and resources." (Packard, 1986) President Bush requested a review of DoD management practices resulting in several Defense Management Review Decisions (DMRD) aimed to achieve cost savings through reducing overhead, eliminating redundant functions, and implementing modern business practices. In November 1989,

...the secretary of defense sent to the president the defense management report filled with management improvement initiatives to streamline DoD business practices to save over 70 billion dollars by 1997. The first of these initiatives sought to resize the department's supply inventory to support a smaller more flexible

force while maintaining readiness. In May 1990, the DoD introduced a comprehensive, integrated plan that addressed every aspect of how the department managed its inventory. (Morales, 1992)

Reviewing each inventory category and the purpose for holding those inventories, the Office of the Secretary of Defense (OSD), the services and the DLA rewrote all material management policy and methodology. DLA's efforts to standardize business practices and improve inventory practices netted over two billion dollars in savings over a two year period. One of these changes involved increased direct vendor delivery to DoD customers.

In December 1991, the Government Accounting Office (GAO) published a report criticizing DoD's medical inventory practices. They leveled their criticism at the use of a depot (i.e., DLA/DPSC) system to maintain inventories and support requirements. In effect, the depot inventories were too large and, in some cases, non-shelf life stock was held indefinitely for lack of disposal instructions. The GAO recommended implementation of practices similar to those used in the civilian sector. Specifically, the use of "Prime Vendors to deliver supplies from a variety of manufacturers directly to medical facilities." (GAO, 1991) Commercial practices involving Prime Vendors used just-in-time delivery procedures to provide hospitals with needed supplies on demand. This allowed facilities to purchase medical supplies, at a discount, without actually storing and maintaining them in bulk quantities at their own warehouses. The GAO determined the DoD could achieve significant cost savings while maintaining high quality health care. "The trick was to adapt this commercial practice to the myriad Government purchasing and fiscal control regulations, then establish a means of transmitting transactions electronically to both the DoD-wide logistics system and the material management systems of the Army, Navy, and Air Force hospitals."

(Bird, 1993) In March 1992, DPSC established a task force to implement changes in their current business practices, choosing to adopt the commercial concept of the Prime Vendor to acquire and distribute medical supplies for the DoD.

The Prime Vendor is "a single distributor of commercial 'brand-specific' medical supplies for a group of hospitals in a given geographic area." (Tackitt, 1992) The Prime Vendor Program divided the country into 22 geographic regions, with each region having two Prime Vendors, one for pharmaceuticals and one for consumable medical/surgical supplies. These Prime Vendors are then the principal source of supply for their respective consumable medical items for each DoD MTF within that region, providing 24-hour delivery and an on-line interactive catalog and order-entry system. As specified in the contract, a Prime Vendor can be responsible for delivering, stocking, and, if necessary, a full credit return of all items purchased through that vendor.

Since the first contract was awarded in the National Capitol region in January 1993, all of the pharmaceutical contracts and most of the medical/surgical supply contracts have been award. It is estimated that the last medical/surgical supply contract will be awarded in February 1995. Eventually, if long range plans are successfully implemented, the Prime Vendor Program will support Europe, Okinawa and the Pacific Rim, as well as ships at sea and deployed Fleet Hospitals and Army DepMeds Hospitals. The Defense Personnel Support Center monitors the Prime Vendor Program for the Department of Defense. Figure 2-2 illustrates the Prime Vendor concept of medical logistics support.

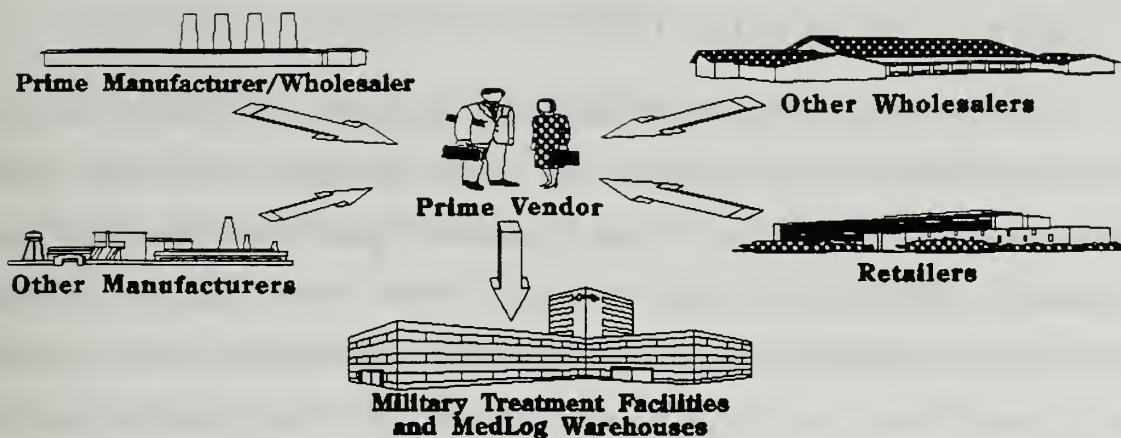


Figure 2-2. DoD Medical Logistics System Using the Prime Vendor Program

The main goal of the Prime Vendor Program is to reduce the MTF's overall delivered cost for brand name medical supplies. This is accomplished by reducing stock levels, reducing losses caused by expirations and overstocking, reducing manpower and using existing industry automation to expedite order processing. The Prime Vendor Program attempts to remove the practice of "just in case" inventories and replace it with "just-in-time" inventory methods, providing "the minimum inventory necessary to keep a perfect system running" (Heizer & Render, 1993) and eliminating "uncertainties wherever possible throughout the supply channel." (Ballou, 1992) Effectively, through a close relationship with one Prime Vendor, demand is analyzed, a pattern is established, and the Prime Vendor determines inventory levels to meet the needs of the major functional units, (e.g., pharmacy, laboratory, surgery) within the MTFs, thereby reducing response time and leadtime variability. The Prime Vendor Program, by "meeting the goal of having the right goods at the right place at the right time" (Ballou, 1992) has thus eliminated both the waste of overlapping functions and the MTF's extra inventories resulting in a more responsive, less expensive medical logistics system.

C. PRIME VENDOR SELECTION

Before DPSC could award Prime Vendor contracts, it first had to determine the specifications for the contracts and obtain the agreement of the various pharmaceutical manufacturers. These agreements, called Distribution and Pricing Agreements (DAPAs) were required in order for the Prime Vendors to distribute products from these manufacturers. Additionally, the DAPAs set the maximum price Prime Vendors can charge for each product. DPSC negotiates the best fixed prices from manufacturers and dealers, weighing heavily in favor of technical proficiency and favorable procurement history.

DAPAs contain the specific pharmaceutical items available through the DPSC Prime Vendor contract. The Prime Vendor can only offer a product for which a DAPA has been negotiated. As DoD medical logistics planners increasingly rely on Prime Vendors, manufacturers are encouraged to list the majority of their commercial products in the negotiated DAPA. As of September 1994, approximately 22,700 pharmaceutical and 65,800 medical/surgical items are available through the Prime Vendor Program. The FSC items supported by the Prime Vendor Program are listed in Appendix C. New products are constantly being introduced into the commercial marketplace and incorporated into medical standards by health providers. The DAPA allows enough flexibility to add or delete commercial products based on the needs of the manufacturer and/or the military health providers. Once DAPAs are established, a competitive bid process is completed to select the regional Prime Vendors, with the DPSC Medical Directorate being the contracting authority. The minimum contract is for one year and the maximum contract commits the government to five years.

D. THE PRIME VENDOR CONTRACT

Prime Vendor contracts are indefinite-delivery contracts as defined in the Federal Acquisition Regulation (FAR 16.5). The terms and conditions provide for a modified requirements contract (FAR 16.503) used to fill all actual purchase requirements for covered items for participating activities. DPSC is responsible for awarding and administering these contracts with commercial distributors, as well as paying the bills for items ordered.

The Prime Vendor will provide supply support for the bulk of the MTFs' pharmaceutical and medical/surgical needs. MTFs covered by a regional Prime Vendor are obligated to use the Prime Vendor to purchase any item included in the DAPA. To obtain the best price and/or customer service, the MTF may use another source if:

- the item is available at a lower price from a DoD depot;
- the item is carried through a DPSC medical electronic commerce program, providing direct delivery from the manufacturer;
- the item is available from a mandatory source (i.e., Federal Prisoner Industries, the National Institute for the Blind, or the National Institute for the Severely Handicapped);
- the Prime Vendor cannot deliver the item within the 24 hour delivery period due to the item being not in stock or back ordered by the manufacturer; or,
- the item is available through the DPSC Mail Order Program.

MTF's may purchase items stocked by the Prime Vendor even if they are not covered by a DAPA. In this instance, the Prime Vendor becomes an additional (not mandatory) source of supply.

There are minimum service levels set forth in the contract that each Prime Vendor must achieve. First, Prime Vendor contract specifications require vendors to maintain a 95 percent fill rate for contract items. "Fill rates are the average percentage of orders fulfilled and delivered in accordance with a purchase order, usually based on the number or lines or total dollars filled." (DISA, 1994) Since the first contract was awarded, the Prime Vendors' fill rate typically averages around 97 to 98 percent. Another very important aspect of the program is that the 95 percent fill rate must be achieved within 24 hours of placing the order, five days per week. For emergency orders, this requirement is extended to six days per week. The contracts allow for two emergency orders per month at no extra cost. The cost of additional emergency orders will be charged to the ordering activity, though there have been numerous instances where the Prime Vendor has not charged for additional services. All emergency orders must be complete and delivered within six hours. The Prime Vendor must be able to provide to as few as two and as many as 15 delivery points within a geographical region. Finally, the ordering activity should receive status of their order within two hours of transmittal. The average status time of the program so far is 20 minutes. With this rapid status time, customers are provided the benefit of knowing whether their order will be filled, thus providing the opportunity of seeking other sources for necessary supplies.

E. CONCEPT OF OPERATION

DPSC maintains its role as contract manager for regional Prime Vendor contracts and as negotiator for DAPAs with various manufacturers. Once the negotiations, DAPAs and contract awards are completed military treatment facilities are provided the necessary equipment and information they need to order from their regional Prime Vendor. Under the terms of the contracts, the Prime

Vendor provides the hardware, modems, software and technical training to participating medical activities to input their orders. In some contracts the Prime Vendor has provided bar code scanners as well.

The medical activity is now obligated to obtain all their Acquisition Advice Code (AAC) "L" (local purchase non-stocked items) pharmaceuticals and medical/surgical supplies covered by the contract from the Prime Vendor. If a participating activity purchases pharmaceuticals and/or medical supplies from another source, the terms and conditions of the contract are violated and the government, through DPSC contracting offices, is placed at risk for monetary damages.

The Prime Vendor lists their items in an electronic catalog, listing the products and prices from the various manufacturers they carry. The price of each item covered by the Prime Vendor Program is determined by the DAPA, with a Prime Vendor distribution fee (negotiated in the contract) added to each item. Additionally, since DPSC is the acquisition agency monitoring the Prime Vendors in all regional areas, they also attach a one percent cost recovery factor. "The price shown in the Prime Vendor electronic catalog is inclusive of all surcharges and represents the delivered cost of the material." (BUMED SOP, 1993)

Ideally, before the medical activity begins purchasing items from its Prime Vendor, they provide their demand history for the previous six weeks and continue to provide demand requirements until their on-hand inventory is depleted. By the time this inventory is consumed, the Prime Vendor is prepared to meet concurrent demands of that activity. This prevents delays in initial Prime Vendor response time during the transitional period. Once the ordering activity is on line, they can check for item availability from the Prime Vendor's electronic catalog. If the Prime Vendor stocks the same item from multiple vendors, the ordering activity chooses the manufacturer offering the best price, regardless of the terms of the

DAPA. Once all items have been selected, the medical activity places the order using Electronic Data Interchange (EDI). Copies of the invoices are sent electronically to both the Prime Vendor and the administrating activity (DPSC). Since all ordering is performed through EDI, there is significantly less paperwork and time spent in purchasing and contracting activities.

The Prime Vendor quickly processes the order and then acknowledges receipt and availability to the medical activity within two hours. The Prime Vendor delivers the order within 24 hours, checking the order for accuracy and completeness, and sends an electronic invoice to DPSC where it is matched to the medical activity's order. The medical activity also notifies DPSC of receipt and DPSC issues payment to the Prime Vendor. DPSC then provides central payment to the Prime Vendors via electronic fund transfer for all its supported sites. Figure 2-3 displays the flow of material and information under the Prime Vendor concept.

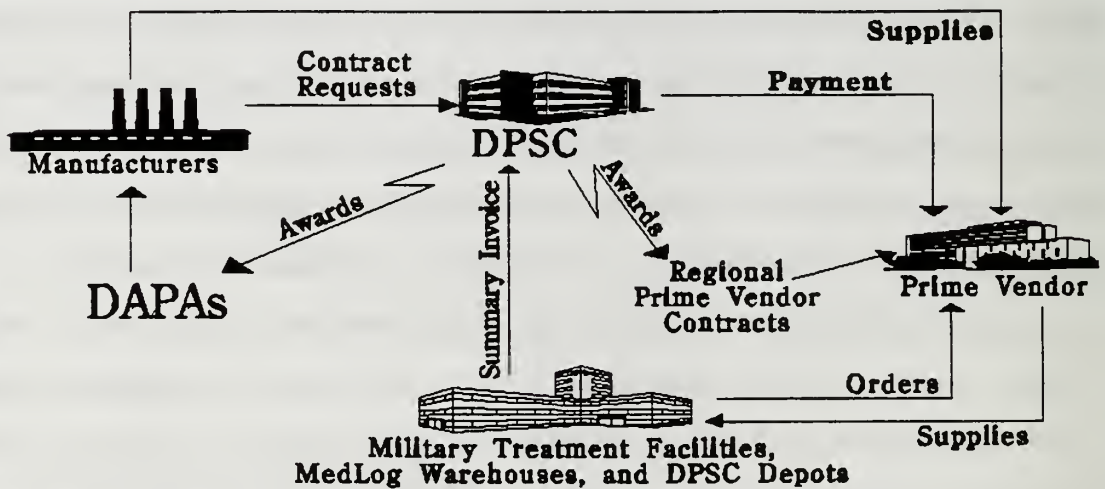


Figure 2-3. Material/Information Flow Under the Prime Vendor Concept

F. ADVANTAGES OF THE PRIME VENDOR PROGRAM

Adopting the Prime Vendor Program has netted many long term benefits for DPSC, the services and military treatment facilities. Some of the most significant advantages are listed here.

1. Reduction in Procurement/Delivery Costs

DPSC maintains its role as contract manager for regional Prime Vendors and as negotiator for Distribution and Pricing Agreements with various manufacturers. As such, there is very little difference in unit prices of pharmaceutical and medical/surgical item from that previously experienced. The significant savings occur in reducing the overhead cost for managing the items at the depots and the ability of vendor-provided information systems to support multiproduct price comparisons. With MTFs receiving the majority of their supplies from the Prime Vendors, DLA/DPSC depots are reducing their inventories and thus eliminating the overhead costs they entailed. As a result, the Prime Vendor provides the same supplies for "between 15 and 16 percent less than the costs of the same supplies bought in bulk and distributed from Government warehouses." (Bird, 1993)

Another significant difference occurs with the return-for-credit option. Under the terms of the contract, a vendor is responsible to stock, deliver, and if necessary accept return of all items specified in the contract. As items reach the end of their shelf-life, and the medical facility believes their demand history indicates they will not be used before expiration, the Prime Vendor will accept return of the item and credit the facility for the price of the items. This avoids the redistribution and disposal costs inherent in the original system, saving the medical facility both the time and money of disposal.

2. Total Visibility of Demands

With the use of EDI, the Prime Vendor Program provides a robust, timely audit capability. "For the first time, DoD will have total visibility of all demands for medical supplies, which is essential for determining wartime consumption estimates." (Bird, 1993) With improved visibility, DPSC can better forecast future requirements and use these forecasts to negotiate better prices with the

manufacturers. Increased visibility will also reflect changing clinical practice patterns, demographic trends, and the health status of the force. Additionally, wartime usage can be tracked faster, allowing industry to better meet surge requirements.

3. Standardized Inventories/Formularies

As better forecasts aid DPSC in improving price negotiations, and efforts are taken specifically in standardization, DoD will begin establishing a

...uniform formulary for all military medical treatment facilities. The intent is to have a uniform, clinically nonrestrictive formulary which will serve as the basis for an equitable, consistent benefit across the direct care system while ensuring access to quality, cost-effective drug therapies...while military physicians can count on the availability of these drugs, the drugs are ones to be used under deployment conditions. Therefore, military practitioners will become familiar with medications on the D-day significant drug list. (Joseph, 1994)

Since deployed Navy and Marine Corps medical units are staffed with personnel drawn from Navy MTFs, it becomes very important to provide the pharmaceuticals and medical/surgical supplies most familiar to those doctors. Since deploying units seldom control from which MTF their assigned doctors originate, a nationwide, standardized formulary provides this familiarity.

4. Best Available Shelf Life

With DLA/DPSC's massive inventory, unless otherwise requested, requisitions from the depots were often filled with items closest to their expiration. Therefore, if the facility had excess stock, the items often ended up on the list for disposal. With the Prime Vendor's 24 hour delivery requirement, excess stock is becoming less commonplace and inventory turnover is much faster. The depots in turn are reducing their stock of Prime Vendor supplied items, letting the Prime

Vendor provide almost all items to the MTFs. The Prime Vendor, supplying several MTFs in a region, also has faster inventory turnover. So, the MTFs get their supplies from the Prime Vendor virtually direct from the manufacturer. Though there are still some instances where supplies expire, the instances are far fewer than with the previous system.

For the Medical Logistics Companies, DLA was required to supply items with at least 18 months' shelf-life remaining. Though this met their requirement for maintaining AMALs, it requires replacing items more often than direct receipt from the manufacturer. With the Prime Vendor virtually supplying the items direct from the factory, items received through this asset would be replaced less often than with the current practice.

5. Labor Reductions

Large inventories require a large work force. As inventories are reduced, less personnel are required to maintain them. With EDI, the procurement and ordering process has been greatly simplified; so, far fewer personnel are required to use the Prime Vendor system than with the previous setup. Finally, as sites continue to convert more items and more commodities for purchase under the Prime Vendor Program, the workload of their local finance offices decreases. These positions can then be reprogrammed to other necessary functions or eliminated to reduce personnel costs.

6. Faster Delivery Time

With the mandatory 24 hour delivery time inherent with the Prime Vendor Program, supplies are received much faster than with UMMIPS or local purchase. "Despite large inventories at the wholesale level, depot-retail delivery times are frequently two weeks or longer for routine items." (Clayton, 1993) At its best, UMMIPS promised delivery of routine items in 30 days, whereas a Prime Vendor

can provide the same item in less than 24 hours. Under its highest priority, UMMIPS could take as long as seven days to deliver. Even pursuing the open purchase option, a medical facility waited an average of three days to receive items. With Prime Vendor, the medical facility can receive two emergencies a month in less than six hours.

G. DISADVANTAGES OF THE PRIME VENDOR PROGRAM

As with any business process, there are disadvantages in implementing a new procurement system. Logisticians must weigh these factors and determine what course of action is best for the organization. Accordingly, some disadvantages are identified and discussed.

1. Less Stock Available for Emergency Use

One of the biggest advantages of the depot system is that the material, if properly maintained, is immediately available to support U.S. forces in the event of a contingency. Normal peacetime production of medical material falls far short of that estimated to support the needs of a military conflict. Therefore,

Consumption requirements in a conflict must be met through a combination of stockpiles of war reserve material and industrial base production. War reserves contribute to the material provided by current industrial production and are used to sustain the forces until production reaches a high enough level to meet all requirements on its own. (Richanbach & Bicksler, 1986)

DoD is rapidly expanding the Prime Vendor concept to cover as many medical logistics functions as possible, including possible use of Prime Vendor for maintaining prepositioned war reserves. However, to balance peacetime budget concerns with immediate wartime requirements, DoD must assess the readiness

and wartime sustainability implications of increased reliance on the commercial pharmaceutical and medical/surgical manufacturers and distributors.

2. Reduction of the Retail Training Base

As previously mentioned, smaller inventories and reduced warehousing requirements require less personnel. As staffs (and the military as a whole) become smaller, military personnel may well find their medical support positions converted to jobs for civilian employees. "The House Armed Services Committee has been pushing the Pentagon to convert up to 10,000 active-duty jobs to positions for civilians, a move the committee believes will improve readiness by freeing up service members for combat units." (Maze, 1994) One of the terms of the Prime Vendor contract is the responsibility to deliver and stock the supplies, requiring less personnel at the MTF for this function. The resulting elimination of medical logistics proficiency may mean deployed medical facilities will lack experienced personnel to order, receive, maintain and issue pharmaceutical and medical/surgical supplies. Though there are plans to extend the Prime Vendor to Europe and the Pacific Rim, it is unlikely to expect Prime Vendor support in a combat zone.

III. THE CHANGING ENVIRONMENT

The constantly changing face of the world today and the significant threat of low intensity conflict operations mandate farsighted logistics planning to ensure effective support for contingencies and real-world operations. As it faces new worldwide and domestic challenges, the Department of Defense must reassess its logistics practices to determine whether current procedures and policies need to be modified. To be truly prepared for tomorrow, the military must recognize the diversity of the challenges it is likely to face. Identifying and confronting these challenges is a necessary part of strategic planning. In short, the military no longer has the luxury of focusing the majority of its defense efforts on a single threat or a single region of the world. To determine how much war reserve to maintain or how responsive our war reserves should be, we must first determine what threatens our vital interests during the foreseeable future and how our military should best prepare for these threats. This chapter examines some of the international and domestic issues now affecting the need for prepositioned war reserves.

A. GLOBAL CHALLENGES

The end of the 1980s brought with it the fall of the Berlin Wall. As sledge hammers pounded at the masonry once dividing the world into two distinct powers, the focus of 45 years of Cold War military planning was shattered. Where American forces once stood on constant alert, ready to repel any attack by Warsaw Pact forces dedicated to our demise, there now stands a group of nations extending hands of friendship. Our nation, our citizens, and our allies are optimistic about the prospects of long standing peace throughout the world. This dynamically changing environment forces our nation's military to redefine its role

in maintaining world peace. The Soviet threat once drove force planning, defense budgets, training, strategy and tactics, equipment, research and development, intelligence efforts, and troop deployments. It is no longer enough to point at the world's only other major power and, because they were our sworn enemies, claim them as the reason we conduct business as we do. "Those who plan U.S. military forces must deal with a new world and establish, almost from scratch, what military capabilities are available, what missions best employ them, and by what criteria their effectiveness now needs to be judged." (Mazarr, 1993) Instead of facing one major threat, and gearing our military industrial base toward defending ourselves and our allies against it, military planning is now focused on four potential scenarios: resumption of a malevolent Soviet Union or other power as a global threat; one or more large scale regional conflict; peace enforcement/peace keeping missions; and, humanitarian relief missions. Each scenario, discussed below, requires a different rate and capability of response.

1. Resumption of a Global Threat

In terms of the threat imposed and the size of response required, the resumption of some form of global threat would require the United States to embark on a sizeable military reconstitution. Such a threat exists primarily in those countries where experiments are underway to improve democratic government and free market economics, most notably in Russia and/or China. Due to the massive reduction in U.S. military capability over the last few years, responding to this threat would require reconstituting our combat effectiveness. President Bush, in his *National Security Strategy* of August 1991, defined strategic reconstitution as "...the ability to generate a credible defense faster than any potential opponent can generate an overwhelming offense."

The difference, so far as maintaining war reserves for such a contingency is concerned, is that the United States now has a much longer leadtime to prepare.

For global war, the DoD maintained enough stocks so each theater commander-in-chief could employ their forces alone and for some considerable time without having to compete with other theaters for limited reserves or industrial surge. Strategic reconstitution reaches the heart of America's ability to generate forces and equip them for her defense and that of her allies. (Power, 1992) However, a new global threat would easily be recognized in its infancy, giving the United States sufficient time to reconstitute its forces, including prepositioned war reserves should they have expired without replacement. If a resurgent global power were the only world threat, the military could easily eliminate much of its supply reserves and their associated holding costs. The commercial pharmaceutical and medical/surgical industry, with the exception of certain military-unique items, is more than capable of rebuilding military medical war reserves. Such a strategy, however, requires the U.S. and its allies to determine the response time available to reconstitute a credible defense capability, including a realistic assessment of the industrial base capability, in time to meet the emerging threat.

2. Large Scale Regional Conflicts

Unfortunately, the demise of the Soviet Union has not totally eliminated the threat of conflict. Before the Soviet Union dissolved, the world was balanced between two major camps. These camps acted as a control valve over many of their satellite nations. Because the risk of a war escalating into a superpower confrontation lurked behind any potential regional conflict, the major powers were able to prevent many smaller wars from breaking out. Economic and political instability threaten nations all over the world. Now that the bipolar power structure has ceased to exist, operations against a greater variety of potential aggressors is more likely today than at any time during the cold war. Add the

proliferation of sophisticated weapons to this greater threat and planning for military requirements becomes more challenging.

With regional conflicts it is the need to project power into areas important to our interests, however unlikely it is a conflict would directly threaten the United States. Maintaining the ability to defeat hostile regional powers is essential to protecting smaller allied or friendly states. The need to prepare for a regional conflict, perhaps on the scale of Operations Desert Shield and Desert Storm, presents a credible excuse for expending limited fiscal resources. Like the Iraqi invasion of Kuwait, the U.S. may receive little advanced warning of attack and require expeditious deployment of its forces. Even if intelligence sources recognized a growing threat, the U.S. must decide at what point conventional deterrence ends and deployment preparation begins. History suggests that we most often deter the conflicts we predict and fight those we did not expect. As such, we must have forces ready to face this type of threat should it occur.

This type of threat is the most militarily demanding, for once deterrence has failed a sizeable military establishment is required to defeat the aggressor(s). Understanding this threat does not necessarily make it simple to determine the size of forces, or the amount of war reserves, the U.S. must maintain. President Clinton's *National Security Strategy* states we must

...prepare our forces to confront this scale of threat, preferably in concert with our allies and friends, but unilaterally if necessary. To do this, we must have forces that can deploy quickly and supplement U.S. forward based and forward deployed forces, along with regional allies, in halting an invasion and defeating the aggressor.
(Clinton, 1994)

U.S. military planners cannot give equal emphasis to all possible contingencies. They possess neither the resources nor the force structure to build and maintain

comprehensive capabilities for reconstitution, regional conflict, peacekeeping, and humanitarian missions all at once. U.S. defense policy always attempts to prioritize potential missions. A close analysis of the nature of various contingencies faced by U.S. forces, and the U.S. interests at stake in them, suggests that U.S. military forces ought to be designed, prepared, and their development prioritized with primary emphasis on regional conflicts. Current U.S. efforts are geared toward fighting two nearly simultaneous major regional conflicts (MRCs). (Aspin, 1993) Assuming these conflicts are unpredictable and unexpected, responding to them will require a sizeable force with enough reserves to keep them supplied until industry can answer the call.

A close examination of industry is required to determine just how responsive they are to such a call. It is doubtful that the pharmaceutical and medical/surgical industry can meet all immediate requirements of a U.S. involvement to one major regional conflict. It is safe to assume, however, that these industries can rapidly regenerate and replace the PWR issued in this circumstance. Using the recent Persian Gulf conflict as an example, "preliminary investigation indicates that despite some shortcomings, the industrial base was reasonably responsive to the needs of the force." (DoD, 1991) Indeed, assuming two MRCs do not break out simultaneously, it is feasible to maintain only the medical reserves necessary to fight one MRC. Once those stocks are issued, we could reasonably expect the commercial medical supply industry, through the Prime Vendor Program, to timely reconstitute our medical PWR. Indeed, reconstituting this PWR may well provide the impetus for preparing industry for surge. The problem then, since the region cannot be predicted, becomes choosing where best to maintain that PWR.

3. Peace Enforcement/Peace Keeping Missions

"In addition to preparing for major regional contingencies, we must prepare our forces for peace operations to support democracy or conflict resolution." (Clinton, 1994) We must work to shape and guide the forces of change in the direction that best serves the needs of our nation. In doing so, the United States, in concert with United Nations' efforts, will find itself increasingly involved in punitive military actions in various regions of the world. Referred to as "peace enforcement," these efforts are designed to enforce international rules and principles on countries bent on brutalizing their neighbors or their own populace. It remains in our best interests to contribute toward maintaining a stable and secure world, a world that will advance the welfare of all peoples in an environment that fosters economic development and furthers individual freedom and human rights. As seen throughout the world today, international turmoil, aggression, and conflict are not relegated to the pages of history. Drives for regional hegemony, resurgent nationalism, ethnic and religious rivalries, drug trafficking, and terrorism are certain to challenge international order during the final decade of this century. If we are to deter conflict at the lower spectrums of violence, we must maintain credible contingency and crisis response forces.

These missions require much less military force than that of major regional conflicts. Our involvement may only consist of airlift, global communications and logistical support. Never the less, peace keeping/peace enforcement brings with it broad and ill-defined goals, and the danger of terrorism or violence against U.S. forces is still prevalent. Regardless of the occasion, our involvement in peace keeping will no doubt take place only after deliberate planning and identification of objectives. Increased public scrutiny in such operations puts pressure on the President to seek congressional approval before committing forces to peace operations. "Congress is critical to the institutional development of a successful

U.S. policy on peace operations." (Clinton, 1994) Given this guideline, the decision process required to commit our forces to support peace operations will give our forces ample time to prepare.

Regardless of the operation, the size of forces and required supplies for peace missions falls far short of that currently maintained by the three services. As with MRCs, medical supplies for peace operations could be immediately drawn from one PWR source, with those stocks brought back to previous levels through the Prime Vendor or direct industry procurement. Indeed, if sufficient warning time is provided, the Prime Vendor could very well meet the requirements of such a deployment without drawing from reserve stocks at all.

4. Humanitarian Relief Missions

Humanitarian missions most often call for the protection and distribution of food and medical services and supplies, providing strategic lift for such distribution, and rebuilding the country's government and logistical infrastructure. Again, U.S. involvement will most likely be part of a UN commitment; the size of our response will vary according to our share and the impact on our own national security. Though most humanitarian efforts involve little military action, the countries most likely to be affected are considered backward by western standards. As such, military logistics plays a key role in the operation's success.

A great majority of humanitarian efforts involve medical support, primarily in the areas related to treatment/prevention of disease and malnutrition. A common characteristic of developing nations is that minimal health care is available for a large part of the population. Medical units assigned to the effort are authorized through Title 10 of the U.S. Code to provide their services for humanitarian assistance. (Hogberg and Stone, 1993) These medical units possess a level of sophistication and expertise unheard of in rural fringes of developing nations and the personnel will can provide their services to the indigenous

population. Besides temporarily alleviating the burden of nonexistent or minimal health care for the general populous, medical personnel can develop medical training programs for local healthcare providers.

One of the key factors affecting medical requirements planning for humanitarian missions is the desired capability. As previously mentioned, the type of care medical personnel can expect to provide vastly differs from a full scale military involvement. Inherent in the medical PWR concept is the need to keep medical supplies to treat combat casualties. Where some of these supplies can be used in humanitarian operations, the quantity required differs from that of military conflict. Additionally, there are some supplies particularly suited for humanitarian operations that are not maintained in war reserves. A particular case in point is the recent operation in Haiti, Operation Uphold Democracy. Before the USNS Comfort (TAH-20) deployed as the primary casualty receiving ship for this operation, it regenerated its Authorized Medical Allowance Lists. Using the Prime Vendor, who achieved a 92 percent fill rate in three days, proved successful in this regeneration. However, AMALs are designed to support a heavy surgical/trauma patient mix involving wounds from bullets and other shrapnel. Once the mission changed from a forced entry/amphibious operation to that of peacekeeping and humanitarian support, the Comfort's clinicians quickly determined the AMALs were incorrectly configured for such a role and recommended additional supplies not contained in the AMALs.

Although participation in humanitarian operations is a growing role for the military, maintaining medical supplies in war reserve for such a purpose is not, and should not, be a priority. These missions involve uncertainty as to type and amount of medical capability and most often allow sufficient warning time for medical personnel to determine and procure necessary supplies. Again, given

adequate warning, the industry and the Prime Vendor can provide timely response to these missions, alleviating the need to maintain and use reserves.

B. DOMESTIC CHALLENGES

The end of the Cold War brought with it demands for domestic changes. Our national security, no longer defined strictly in terms of military defense, now focuses on economic stability and financial prosperity as well. With decreased global threat comes demand for budget and military reform here at home. Responding to a conflict anywhere on the globe requires different forms and/or methods of response. Though the United States, as the strongest remaining world superpower, continues to play a stabilizing role through geopolitical alliances around the globe, it is still responsible to its citizens to meet domestic concerns. Likewise, with a conscientious responsibility to deter aggression around the world, its military must maintain a global response capability and credible threat.

1. The Budget

First and foremost among the nation's concerns is our economy. Revitalizing the economy is essential if "we are to sustain our military forces, foreign initiatives and global influence." (Clinton, 1994) Though the need to sustain our military forces is recognized, the DoD is expected to maintain a force from a greatly reduced share of the budget. As can be seen in Figure 3-1, fiscal resources allocated to the Department of Defense have steadily declined. This continues the real decline in defense spending that began around 1985. In constant 1994 budget dollars, the Fiscal Year 1995 budget is 35 percent below that of fiscal year 1985, the peak year for DoD budget authority since the Korean War. With DoD's share of the budget expected to fall by another 14 percent by 1998, relief is nowhere in sight.

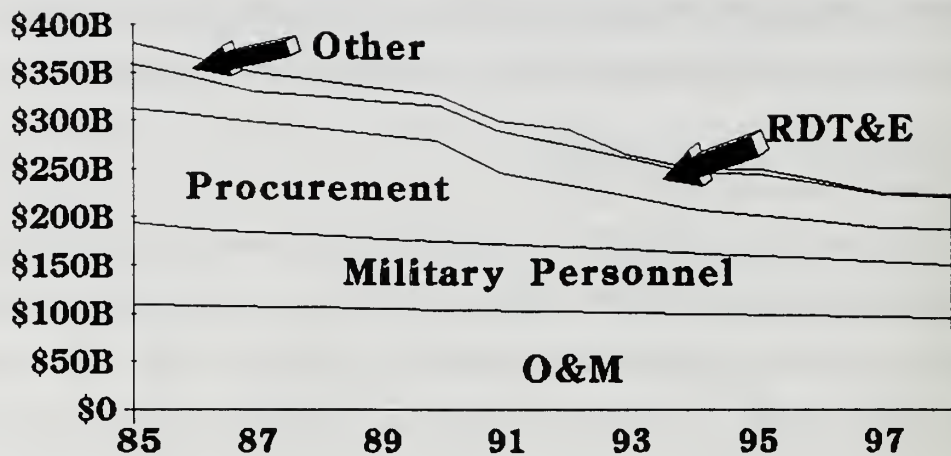


Figure 3-1. DoD Budget Authority Trend
(in constant 1994 Dollars)

Once again, as follows every major war in U.S. history, the military is facing budget cuts which threaten the very strength of our armed forces. As their budget share is reduced, Pentagon planners seek to reduce expenditures in the current infrastructure to procure new, more effective weapons systems. Doing so risks cutting the operations, maintenance and training budgets to a point of producing a "hollow" force of low morale and effectiveness. To avoid this risk, every organization must strive to save money where possible.

Attempting to save money can, however, be especially risky when it affects medical reserves. With millions of dollars worth of expiring supplies requiring replacement every year, budget constraints force cutbacks that threaten readiness. Even at the height of the Reagan era DoD buildup, when money was considered sufficient, the services were not filling their wartime medical requirements for shelf-life items. In 1986, the Department of Defense Inspector General audited medical supply support in the Pacific. They found that "only the Marine Corps fully met its war reserve requirements for dated and deteriorative items." (DoD IG, 1986) Failing to replace this critical war reserve saved the DoD millions of dollars by reducing procurement and disposal costs, but had seriously degraded the

services' ability to meet their wartime medical mission. In fact, Army hospitals deploying to support Operation Desert Shield lacked much of their initial medical supply issue, a 10-day authorization of potency and dated (P&D) items, such as narcotics, anesthesia, antibiotics, and X-ray film. The Army had failed to maintain sufficient quantities due to "the high cost of replacing P&D items when their shelf-life expired." (GAO, August 1993)

It is up to individual military bases and organizations to cut costs where feasible and, if possible, without adversely effecting readiness. Military medicine and military treatment facilities, by adopting the Prime Vendor Program, are saving defense dollars while improving healthcare. Yet, at the same time they are cutting costs, the cost of healthcare is rising.

Military facilities are similar to private medical facilities in some ways. Both are responsible for providing quality inpatient and outpatient health care, use the same or similar supplies, and provide training to physicians. In addition, both must control the cost of health care as prices for supplies and equipment escalate. (GAO, 1991)

Since costs are rising, emphasis is still on further reductions. These same rising costs are affecting the maintenance of AMAL war reserves as well. Since Aguigam (1991) completed his thesis, where he identified a replacement cost of approximately two million dollars for Camp Pendleton stocks alone, the Marine Corps has reduced its AMAL requirements by approximately 58 percent. Where once the projected casualty rate for a worst case scenario was 20,000 in 60 days, that rate is now estimated to be 8,381 personnel. (CMC WASHINGTON DC 160101 SEP 92) The increasing cost of pharmaceuticals since then have driven the Fiscal Year 1995 replacement cost for those reduced AMAL requirements to 1991 levels, with no relief in sight.

The shrinking defense budget, while providing the country with a "peace dividend," threatens our country's military readiness. Despite the best efforts of medical planners, the stock of medical PWR continues decrease due to lack of funds. Like all procurement functions, we must determine if we are trying to maintain too much medical material. The pharmaceutical and domestic transportation industries are responsive enough to meet all but the most military-unique initial requirements.

With smaller budgets, we will find it harder and harder to maintain the wide balance of capabilities required to counter sudden, unexpected geopolitical challenges and newly emerging threats or capabilities. This will place a premium on early political decisions. Although these challenges demand U.S. action, the need to husband scarce resources suggests we must carefully select the means and quantity of our prepositioned war reserves.

2. Strategic Lift

Throughout the Cold War, the political and economic climate prohibited the United States from forward-basing sufficient forces and equipment to counter potential military threats in all areas of strategic importance. In coordination with its allies, the United States relied on rapid deployment of military forces, and their supplies, based in the United States or from overseas bases and depots. Unfortunately, "America has undervalued the role of logistics in formulating military strategies, emphasizing combat force structure at the expense of logistics force structure." (Menarchik, 1993) Strategic mobility has three components: sealift, airlift, and prepositioning. Meeting initial transportation requirements is often the most difficult part of defending America's vital interests. As such, its capability and impact on medical reserve requirements is discussed.

a. Sealift

Sealift has historically accounted for the majority of all military cargo transport requirements. Military planners, having watched the U.S. Merchant Marine drop from 578 major ships in 1978 to less than 200 today, increasingly rely on the commercial transportation industry to meet wartime needs. Few of these planners foresaw the changing face of the commercial sector. The commercial shipping industry is moving away from self-sustaining ships capable of offloading breakbulk cargo and unit equipment/vehicles at austere ports. To maintain their competitive advantage, shipping companies are converting their fleets to containerized transport, which require modern port facilities. Though a detriment to moving military unique equipment, containers can be used to move various types of medical material. The problem here is that much of the world's sealift is limited to less than 24 knot speeds. For operations like the Gulf War, resupply could take over three weeks just to complete transit. Although good for moving medical supplies and equipment in preparation for a future land battle, it is not a responsive method of medical resupply. Sealift's greatest contribution to the medical effort is reducing the demand on available airlift, freeing aircraft for rapidly resupplying critical medical supplies.

The DoD published a Mobility Requirements Study (MRS) in January 1992, identifying serious deficiencies in current strategic sealift capability. The ship mix in the National Defense Reserve Fleet (NDRF) is now acknowledged as inadequate and, as fewer Americans enter the merchant service each year, the aging fleet has fewer able bodied seamen left to man it. (Hayes, 1992) Realizing there is no substitute for sealift, the MRS recommended adding 22 ships to the nation's deployment forces. Regardless of this additional lift, the nation lacks the necessary sealift to simultaneously commit its forces to two MRCs. The U.S. will have to choose which conflict to support until such time as the necessary forces

are in place, at which time this new fleet can be used to transport military equipment and supplies to a second MRC.

b. Airlift

Airlift has always been planned as the first response toward meeting the initial surge of a U.S. deployment. The advantage of airlift is, of course, its speed of delivery. Responding to regional conflicts requires the ability to get the most capability there at the best possible speed. As long as forces are traveling light, airlift cannot be surpassed in providing this capability. However, its limitations as a form of long term sustainment has always been realized. As such, strategic planners only project the use of airlift for transporting five to ten percent of materials and equipment during large-scale operations. The remaining requirements are met with sealift.

The Military Airlift Command, with its aging fleet of C-5s, C-141s, and C-130s had, until Operation Desert Shield, historically provided the majority of necessary airlift for world crises response. The Gulf War provided the first ever test of the Civil Reserve Air Fleet (CRAF), requiring commercial airlines to provide aircraft to help meet the vast, long-distance air logistics requirements. The CRAF, initiated by Executive Order 10219 in 1951, was designed to provide financial support to the commercial air industry in return for helping meet just such a contingency requirement. The airlines, once quick to take advantage of this subsidy, learned the consequences of their actions during the Gulf War. As a result of having their aircraft tied up transporting troops and equipment half-way around the world, their profits were severely curtailed. Because of this profit loss, the future of the CRAF program is now in doubt as airlines find other ways to finance their businesses.

Airlift, able to reach the farthest reaches of the world in a relatively short time, is important to the military medical community for two reasons: to

resupply medical equipment and supplies and to transport severely wounded personnel to more capable facilities outside of the combat area. With airlift capability steadily declining, it may take longer for U.S. forces to deploy. When the U.S. responds to a crisis, it will have to prioritize requirements for the limited airlift. Immediate response to aggression usually requires placing combat forces in theater first, as evidenced in the Gulf War, followed by the support train. Unfortunately, this logistical tail includes the medical units. It is not advisable to enter a war until the forces have the medical capability in place to treat the wounded.

The late twentieth-century soldier does not expect to be left to die of his wounds on the battlefield. Today the victim is unlucky who, escaping death outright, succumbs to the effects of his wounds.
(Keegan, 1976)

Sending a unit to war without the necessary medical personnel, equipment and supplies risks every American unlucky enough to be wounded. The politicians and citizens of our country will not tolerate Americans facing war without such medical support. Former Secretary Of Defense Les Aspin outlined the initial stages of U.S. Combat Operations as halting the invasion, followed by a build up of U.S. combat power in the theater before decisively defeating the enemy (Aspin, 1993). This initial stage is required as much from a lack of responsive lift as it is from budgetary constraints preventing abundant U.S. forces from being based near potential trouble spots. Logistics planners will have to first use the limited airlift to place deterrence forces, then concentrate on moving additional combat forces and logistics support into the theater. Even in the Gulf War, "...the military strategy depended on the logistics buildup, and logistics determined the timing of the military strategy." (Menarchik, 1993) U.S. forces will build from a deterrence, holding off on their attack until a balanced military force is present

to attack the enemy. As the mission of the deployed force evolves from deterrence to combat operations, the medical support requirements will expand. In an indirect fashion, the shortage of strategic airlift has given medical logistics planners some leeway. As Desert Storm showed, America has plenty of bombs, bullets, planes, tanks and troops, but barely enough lift for timely deployment to meet its declared strategies. While the U.S. can immediately place the forces needed to deter and defend a strategic area, it takes time to build up an assault capability. Since AMALs are not depleted until actual casualties are treated, this deployment delay gives the pharmaceutical and medical supply industry, as well as the Prime Vendors, around three to four months to reconstitute medical reserves before the items must be in the combat zone.

c. Land-Based Prepositioning

Land-based prepositioning began in 1961 with Army assets staged in Germany. Designed to prestage supplies and equipment for use against a Soviet invasion, its necessity is now in question. Despite its original design, the U.S. Army Medical Materiel Center Europe (USAMMCE) played a key role in the Persian Gulf conflict. Medical supplies were transported from its vast 93-acre medical depot in Pirmasens, Germany, to Saudi Arabia at a rate of 3,000 tons a month. (Scott, 1991) Even though this stockpile of supplies was on the wrong continent, its location actually proved a bonus. Because movement from Europe to Saudi Arabia was much quicker than from the U.S., USAMMCE significantly enhanced post deployment support of field units. Field orders were filled much faster than from CONUS based depot stocks. Unfortunately, this resupply was often threatened by lack of military transportation. Equipment or other supplies receiving a higher priority on flights to the area of operations meant backlogged medical supplies in Germany.

Prepositioning equipment at strategic locations, and the necessary personnel to support it, can be a strategic paradox. Effective prepositioning requires staging U.S. forces in an area where our vital interests are threatened. Unfortunately, few nations wish to antagonize an aggressive neighbor and most are averse to permanently stationed forces from another nation within their sovereign borders. Unless the U.S. prepositions its necessary equipment and supplies in or near the correct region, it faces a significant logistical challenge when countering aggression. In remote locations such as Norway, a stockpile located in the wrong place could be more inaccessible than having it in the continental U.S.

It is therefore a matter of weighing up the balance of advantage to be gained by prepositioning stockpiles in the projected area of operations, against the possibility that the next war will not be fought in that area at all. Even if they are not exactly in the right place, by being on the right continent, or area of that continent, much movement effort can usually be saved. (Thompson, 1991)

With the U.S. working to reduce the number of overseas bases, unless it can maintain cooperative agreements with its allies to maintain these stockpiles, prepositioning may prove too politically and financially expensive.

d. Afloat Prepositioning

Afloat prepositioning is made up of two elements. The first element is the 13 ships of the Marine Corps' Maritime Prepositioning Force (MPF). Divided into three squadrons, each has enough combat and combat support equipment and supplies to fully equip and sustain 16,500 Marines for 30 days, and can reach any trouble spot in less than 10 days. The second element, courtesy of the MRS, is the growing number of Afloat Prepositioning Force (APF) ships used by other services to prestage common sustainment and support items, stationed in the Indian Ocean and the Mediterranean Sea. Afloat prepositioning is the answer

to having the right forces at the right place at the right time, ready to halt an aggressor before he can take tactical advantage over a relatively vulnerable host nation or U.S. enabling forces.

Both the MPF and APF carry a 30 day supply of combat support stocks. Each MPF squadron can support roughly one third of a MEF for 30 days, while the APF is designed to support a tailorable corps consisting of five divisions. This support includes consumable medical supplies. The APF will be used to place forces anywhere in the world requiring U.S. response, while the original MPF concept is to have one squadron respond to its respective area of responsibility. This concept was overlooked during the Gulf War when all three squadrons supported U.S. forces in Saudi Arabia. Regardless of original intent, both forces provide deployed American forces substantial initial capability, including medical support, and are the mainstays of military preparedness and deterrence.

3. Environmental Concerns

American citizens are rapidly growing concerned about industry and military disposal practices. Just within the last decade, headlines boldly displayed Navy disregard for medical waste disposal at sea. Bags of syringes and vials were pictured washed up on the nation's shoreline. Though rightfully placed, this growing concern increases the cost burden of proper waste disposal. Although now only a small percentage of an item's replacement value, disposal costs are expected to rise as industry faces increasing environmental safety constraints. Although the MedLog Companies expend a great deal of effort to redistribute their supplies before expiration, often giving the supplies to local military treatment facilities free of charge, they still face expiring items requiring disposal. As disposal costs rise, funds available for maintaining AMALs are burdened, limiting the capability to maintain readiness.

4. The Industrial Base

Medical material is vital to the delivery of medical care in both peace and war. Medical supplies are literally a life-or-death commodity essential to combat support. Without crucial medical supplies and equipment, the Service Medical Departments could not accomplish their missions. "It is important to treat the wounded quickly and efficiently, not only to maintain morale, but also in order to return as large a percentage of treated men to the battle as quickly as possible." (Thompson, 1991) To insure adequate supplies are available, the DoD and the services must examine expected requirements, current war reserve policies, and industrial base preparedness plans to insure adequate medical readiness and wartime sustainability.

Each service's medical department must provide or arrange for the provision of medical supplies for its individual service. In 1986, a full-time Deputy Assistant Secretary of Defense for Medical Readiness was appointed to coordinate all aspects of medical readiness for the three services, which has improved inter-service coordination for medical planning, training and logistics. Similarly, field medical equipment is being standardized between the services.

Traditionally, the services plan to meet wartime consumption requirements through a combination of war reserve stockpiles and industrial base production. War reserves are used to sustain the forces until production reaches a high enough level to meet all requirements on its own. Although many studies have concluded the pharmaceutical and medical/surgical supply industry can meet wartime commitments, most war reserves are based on requirements for large-scale war against the former Soviet Union. Little is available evaluating the industry's ability to meet initial deployment requirements for one or two regional threats and whether war reserves are even necessary to adequately respond to this new threat.

At the beginning of Operation Desert Shield, Iraq was considered the world's fourth largest land force. As such, barring the rise of a new superpower threat, the U.S. and her allies have successfully eliminated the largest major regional threat they can expect for some time. Even in this relatively large scale deployment,

...despite some shortcomings, the industrial base was reasonably responsive to the needs of the force. These, and similar instances reinforce the continuing requirement to balance our war reserve programs and depot production capabilities with a realistic assessment of industrial base capability. (DoD, 1991)

An August 1993 GAO report confirmed this assessment for Operation Desert Shield except for the procurement of military-unique items, with four items proving specifically difficult to procure: (1) Mark I Nerve Agent Antidote Kit; (2) atropine injector (part of the Mark I Kit but also issued separately); (3) pyridostigmine bromide tablets (pre-treatment for nerve gas), and (4) immune serum globulin (a vaccine to boost the immune system). Additionally, a 1988 National Defense Study identified production of the autoinjectors used with the Mark I Kit as inadequate due to a patent on the device and its military specific design.

With the exception of these military-unique items, industry is capable of meeting wartime surge demands. It is up to the Assistant Secretary of Defense for Health Affairs to determine whether this response can meet expected deployment surge without adversely affecting civilian hospital requirements. If so, the military will find significant cost savings by reducing war reserve requirements for items common in commercial practice.

IV. PROPOSED ALTERNATIVES

Authorized Medical/Dental Allowance Lists (AMALs/ADALs) constitute the authorized allowances of medical and dental equipment and consumable supplies required to accomplish healthcare support missions under combat conditions. A description of the AMALs held by MedLog Companies is included in Appendix A.

AMALs and ADALs are identified with the primary function they are designed to support; i.e., operating room, ward, laboratory, etc. AMALs are further divided into those containing equipment and those containing consumable supplies. For ease in identification, they are assigned a three digit number of the 600 series; e.g., AMAL 618 contains laboratory equipment, and AMAL 619 contains laboratory consumable supplies. (FMFM 4-50, 1990)

AMALs are maintained to ensure there are adequate initial stocks on hand to support deployed forces until such time as industry can meet the increased demand. However, as discussed in Chapter III, current quantities are based on a short-notice global war with a power that no longer threatens our great nation. Additionally, while U.S. strategic lift is insufficient to support a significant U.S. deployment, there have been dramatic improvements in both the quantity and quality of domestic transportation systems. Since 1980, the number of motor carriers has almost tripled, (GAO, November 1993) and rapid-delivery air freight services have thrived. Our robust intranation transportation industry provides the military with an incredible capability to rapidly redistribute war reserves within the country. This chapter provides alternatives, comparing trade-offs and cost-benefit analysis, to current medical logistics practices.

A. MAINTAIN THE STATUS QUO

No list of proposed alternatives would be complete without offering to maintain the status quo. This section sets the benchmark for comparing potential improvements, as well as showing the current practices and maintenance costs.

1. MEF 60 Days of Supply

Each Medical Logistics Company, under the direction and guidance of the Commanding Officer of their respective Supply Battalion, Force Service Support Group, is tasked with providing for the receipt, storage, management, and issue of Class VIII supplies and equipment to all medical and dental units and elements of the MEF. To accomplish this, they maintain inventory and conduct quality control, stock rotation, and general management of AMALs/ADALs prior to issue to using units. They are also responsible to provide appropriate repair and maintenance for medical and dental equipment of the MEF.

AMALs/ADALs are warehoused in modular form to facilitate rapid mount out and resupply response. However, a number of factors, such as warehouse space and the manpower-intensive nature of AMAL/ADAL management, impose limits on the number of modules which may be packaged and maintained at any given time and place. The MedLog companies, therefore, are only required to maintain a minimum of 25 percent of consumable AMALs in modular form. Referred to as "Out-The-Door" (OTD) blocks, this 25 percent requirement is what is initially issued to deploying units. The quantity of OTD AMALs held by 1st Medical Logistics Company, as well as the minimum 25 percent OTD required, are shown in Table 1. The remaining 45 DOS of Class VIII consumable material is maintained as bulk line item supplies and deploys with MedLog personnel when strategic lift is available. A list of 1st MedLog Company's Prime Vendor supportable consumable AMAL/ADAL requirements is shown in Table 2.

AMAL	Description	OTD Held	Total OTD Value	OTD Required	Total Min Value
619	Laboratory	37	\$ 92,199	26	\$ 64,789
624	Blood Bank	32	29,303	26	23,809
630	Pharmacy	14	68,583	13	63,684
632	Shock Surgical	57	364,555	38	243,037
634	Ward	65	278,704	54	231,539
630	Aid Station	60	534,781	42	374,346
630	Prev Medicine	2	6,431	1	3,216
640	O/R	53	1,213,372	33	755,496
649	X-Ray	37	847,071	26	8,921
699	Sick Call	22	99,242	15	67,665
Total Value			\$3,534,241		\$1,836,502

Table 1. 1st MedLog Company's Out-The-Door Requirements

AMAL	Description	Unit Value	MEF Qty Required	Total Value
619	Laboratory	\$ 2,492	101	\$ 251,692
624	Blood Bank	916	103	94,348
630	Pharmacy	4,899	50	244,950
632	Shock Surgical	6,396	150	959,400
634	Ward	4,288	215	921,920
630	Aid Station	8,913	168	1,497,384
630	Prev Medicine	3,216	3	9,648
640	Operating Room	22,894	131	2,999,114
649	X-Ray	343	102	34,986
699	Sick Call	4,511	60	270,660
Total Value of AMALs Maintained (for 60 DOS)				\$7,284,102
Est Avg Annual Replacement Cost (for 60 DOS)				\$2,428,034

Table 2. 1st MedLog Company's Prime Vendor Supportable AMAL Requirements and Values

Budget restrictions and the expense of these short shelf-life AMALs has prevented 1st Medical Logistics Company from actually maintaining the complete requirements. As of 8 November 1994, 1st MedLog Company faced an unfunded shortfall of almost seven million dollars, with no immediate relief. With a three year average shelf-life (Aguigam, 1991), the estimated average annual replacement cost for a MEF is \$2.4 million, not counting disposal cost. With budget shortfalls restricting the amount of supplies maintained, less are maintained. The cost of replacing only the expiring stocks currently on hand at 1st MedLog Company is almost \$1.9 million. Neither of these figures includes the cost of replacing the required 16,500 vials, at \$6.71 a vial (\$110,715 total), of immune serum globulin; a military-unique item identified in the August 1993 GAO report as difficult to procure during the Persian Gulf build up. First MedLog issued their entire stock of immune globulin during preparations for I MEF's deployment to Kuwait in August 1994.

2. Maritime Prepositioning Force

In addition to the three MedLog Companies, the Marine Corps also maintains the three squadrons of the Maritime Prepositioning Force (MPF). Each squadron maintains enough combat and combat support equipment and supplies to sustain approximately one third of a MEF for 30 days. Though the squadrons are assigned to support the MEF in their respective regions, all three were downed during Operations Desert Shield and Desert Storm, and ships from two squadrons were used in support of Operation Restore Hope in Somalia. The composition of each squadron is shown in Appendix B.

A total of 26 AMAL/ADAL types are required for the MPF ships, with a total of 326 blocks per squadron. Each ship undergoes a 29 day maintenance period every 30 months in Blount Island, Florida. During this one month period, supplies and equipment are examined and repaired/replaced. Once the ships

complete their cycle, the supplies are not replaced again until required for a contingency or upon their return to Blount Island. The contractor for this maintenance is required to maintain 100 percent Class VIII attainment, less refrigerated items, narcotics and precious metals. Medical items must have 18 months or more shelf-life remaining by the date the ship sails. MedLog companies and MEF medical planners are provided the necessary reports to aid in their Fly-In Echelon (FIE) requirements. The FIE, which is the responsibility of the deploying MedLog company, are those items not carried on the MPF ships and those items that expire if the squadron responds 18 months out from the cycle. The total AMAL density levels and value on the MPF squadrons are shown in Table 3.

3. Norway Air Landed MEB (NALMEB)

The Marine Corps also maintains enough equipment and supplies to support a Marine Expeditionary Brigade (MEB) in Norway for 30 days. The Norway Air Landed MEB is the result of a DoD-directed program based upon a memorandum of understanding between Norway and the United States signed in January of 1981. The NALMEB is deployed in Air Force aircraft to reception areas in central Norway prior to hostilities. This method of deployment facilitates the rapid reinforcement of the North Atlantic Treaty Organization's northern flank. It enhances strategic mobility by decreasing the amount of airlift required to move a MEB and reduces force closure from weeks to days.

Consumable medical supplies are also part of this cache of prepositioned supplies. Expiration dates of these stocks, unlike the MPF, are strictly maintained. Every 18 months personnel replace expiring material from every AMAL module. Replenishment items are ordered, properly packaged, and shipped to Norway quarterly. The total AMAL density levels and value of the NALMEB stocks are shown in Table 3.

AMAL	Description	New MPF Totals	Per Squadron MPF Totals	NALMEB Totals
619	Laboratory	42	14	24
624	Blood Bank	60	20	14
630	Pharmacy	33	11	9
632	Shock Surgical	87	29	29
634	Ward	129	43	25
636	Aid Station	90	30	32
630	Operating Room	90	30	25
649	X-Ray	42	14	21
Total Value		\$4.31M	\$1.44M	\$1.27M

Table 3. AMAL Density and Values for MPF and NALMEB

B. PRIME VENDOR VERSUS CURRENT SYSTEM

1. Standard Prime Vendor Contract

a. Overhead Savings

As the DPSC and DLA increasingly rely on the Prime Vendor Program to supply MTFs with needed dated and deteriorative supplies, they anticipate significant reduction of their own stocks. It is indeed conceivable that DPSC/DLA will also procure their stocks through the Prime Vendor. If this occurs, procuring war reserve AMALs through DPSC/DLA would only add a middleman to the process. DPSC's overhead cost for managing operations adds a significant added costs to the current system. The MedLog companies would be wise to adopt the Prime Vendor as a single supply source, thereby reducing costs at least 15 percent over the same items purchased through DPSC depots. (Bird, 1993) This equates to a savings of roughly \$350,000 per MedLog company per year over the current system. Applying this same cost savings to the MPF and

NALMEB obtains an annual reduction of \$215,000 and \$64,000 respectively. Total savings to the Marine Corps would be \$1.33 million per year.

b. Maximum Shelf-Life Savings

Supplies procured through DPSC do not enjoy the benefit of maximum obtainable shelf-life gained through the Prime Vendor Program. A factor involved in the current system is the variation in remaining shelf-life for dated and deteriorative items received from DPSC stocks. DPSC, also concerned with reducing financial loss replacing expiring stock, currently fills MedLog company requisitions with their older stock. As long as the stock has 18 months shelf-life remaining, it's considered sufficient to meet AMAL concerns. For MedLog companies, this means they have to replace expiring stock more often than had they received it directly from the factory. In the worst case scenario, MedLog Company could purchase an item from DPSC and replace it 18 months later, whereas the same item purchased initially from the Prime Vendor would be replaced in three years. The end result, barring price changes and ignoring disposal costs, would be a 50 percent savings; a potential of \$1.2 million per MEF per year.

c. Bar Code Technology Savings

Aguigam (1991) identified cost savings that 1st MedLog Company could achieve through adopting Bar Code technology. His analysis illustrated that the higher accuracy from using bar codes resulted in potential savings of between one and five percent of average annual inventory. Another advantage of the Prime Vendor Program is that, if required, the Prime Vendor provides both the hardware, software, and training for using bar codes in inventory tracking. With current Marine Corps Order 6700.2 requiring each MEF to maintain an average seven million dollar annual inventory, and the Prime Vendor providing the bar

code equipment, there is more savings to be uncovered here. At minimum, the I MEF could save another \$73,000 by using the Prime Vendor Program. If the full five percent benefit of bar code technology Aguigam identified were realized, over \$360,000 could be saved. Applying this to the three Marine Corps MEFs implies a range of savings from \$218,000 to \$1.1 million. Use the same figures on MPF and NALMEB and another \$56,000 to \$279,000 could be saved. Total savings to the Marine Corps would be between \$274,000 and \$1.4 million.

2. Prime Vendor Program with Return-for-Credit

As pharmaceuticals and medical/surgical items near the end of their shelf-life, the MedLog companies attempt to redistribute them to military treatment facilities, often in the form of a free issue. Once the items expire, the companies are faced with significant disposal costs. Expired drugs are disposed of through the Pine Bluff Arsenal or the Defense Reutilization and Marketing Office. Returning this material to DPSC for credit is currently not an option. There is, however, a return-for-credit option offered by the Prime Vendor. Though designed for use by MTFs, whose returns are considered minimal under correct use of the Prime Vendor, the same program could prove advantageous to maintaining medical reserves.

The Marine Corps must consider the differences crediting MTF returns versus returns from a war reserve program. When an MTF has a return, it is most likely due to changes in demand for the item. Unless the MEF responds to a contingency, only a fraction of the total AMAL requirement is consumed. Under perfect conditions, over two million dollars worth of expiring pharmaceuticals and medical/surgical items would be returned each year. The Prime Vendor is in business to make money and there is no profit in a return-for-credit program of this magnitude. The only way to convince the Prime Vendor to take on a task of this nature would be to offer a monetary incentive in the

contract. The cost benefit in this case would depend on this monetary incentive. Under the assumptions of this research, any amount reasonably less than the current \$2.4 million per MEF estimated annual cost would benefit in both replacement value and disposal costs.

C. CONSOLIDATION OF MEDICAL LOGISTICS

Another recommendation from the GAO's 1991 report was to consolidate medical logistics functions, in effect cutting redundancy. As the past eight years have shown, deep budget cuts are inevitable. The cost of not cutting redundant capabilities will be reductions in unique and, possibly, essential forces. Indeed, with the end of the Cold War and our only threat that of at most two major simultaneous regional conflicts, there are two reasons why the Marine Corps maintains 60 days of medical reserves at each MEF, plus three MEB's worth of land-based and afloat prepositioning. First, the Marine Corps will not risk having enough supplies to support two simultaneous MRCs; and second, the Corps desires enough stocks to employ each theater's MEF alone and for some considerable time without resupply from the continental United States. With the change of strategic focus from global to regional conflict, we need only maintain enough initial stocks to last until theater forces are resupplied from CONUS or from other prepositioned stocks, positioned to be moved quickly from one region to another. (CJCS, 1993)

1. The Value of Consolidation

With regional war as the major threat in the world, the chance is small that two MEFs would be deployed at the same time. The Marine Corps could cut its consumable medical war reserve stocks by two thirds, enough to support one MEF, and continue to maintain its afloat and overseas land-based prepositioned stocks. Since a MEB is roughly equivalent to one third of a MEF, the three MPF squadrons combined have enough supplies to last a MEF for 30 days. Add to

these prepositioned stocks the single 60 day supply of AMALs and there are consumable medical supplies available for three months of combat operations. Since medical supplies are measured by estimated casualties, the 90 day clock doesn't start ticking until actual fighting begins. Additionally, DPSC is still required to maintain enough medical reserves to support deployed forces for 120 additional days. Unless another MRC simultaneously breaks out, industry will have ample time to surge production and replace issued supplies and combat demands. By the time the needed lift could be freed to support two MRCs, industry would have caught up with demand and replenished reserves. As such, one cache of medical reserves is sufficient to meet the demands of the current world situation. Add up the savings and the Marine Corps would have \$4.8 million a year to invest in new equipment and training.

2. Better Asset Visibility

Another problem LT Aguigam identified in his 1991 thesis was that human error was inevitable when dealing with inventories. There are times when the vast quantity and variety of the inventory a MedLog company is required to maintain overcomes their dedicated personnel. When these personnel overlook expiring medications, they miss the chance to redistribute it to other medical facilities. Maintaining three separate inventories means even less visibility for available redistribution. Even if caught before the end of their shelf-life, when the MedLog finally does announce availability, the items may well be too close to expiration to be efficiently redistributed. Material redistributed from war reserve material stocks "must have sufficient shelf life remaining so that the peacetime user can rotate through his own inventory" (DoD IG, 1986). The actual dollar value lost depends on the skill of the personnel and the quality of their inventory practices. With three inventories, the opportunity for inventory errors are inevitable.

Consolidation will reduce this margin for error by two thirds, again saving support dollars better used for operations.

3. Meeting Deployment Requirements

Deciding where the Marine Corps should consolidate its consumable medical reserves becomes the next major issue. With unacceptably long lead times required to replace medical equipment reserves, the three MEFs must continue to maintain its AMAL equipment blocks. This requires some MedLog infrastructure to remain at the MEF level regardless of where the reserves are located. Since the U.S. can not predict where in the world its forces will next respond, choosing the ideal location is impossible. This is where the commercial transportation plays a key role. The DoD could negotiate contracts with commercial vendors to provide wartime support, similar to the way it plans to use the Civil Reserve Air Fleet to supplement military airlift assets. The private sector already has adequate private trucking, rail and air fleets that would ensure timely distribution of the medical reserves in the event of mobilization. Given time to prepare the necessary contracts, domestic transportation could move medical PWR to any destination required. Whether the cargo was transported to the point of embarkation, or to an area near the combat theater, America and her allies have the transportation infrastructure to move anything anywhere in the world. Unless improvements in the shelf-life requirements of MPF ships are made, the problem facing the Marine Corps is outfitting the initial deploying forces.

D. REDUCING CURRENT REQUIREMENTS TO 30 DAYS OF SUPPLY

1. Maintaining Crisis Response Capability

Again, maintaining the MPF and NALMEB at their current levels, the Marine Corps could reduce current MEF requirements to maintaining supplies to support the MEF for 30 days. This would reduce each MEF's consumable AMAL burden by 50 percent, yet have little impact on the Marine Corps' ability to support deployed forces. With this alternative, each MEF would maintain the same quantity of "out-the-door" AMAL blocks, keeping the remaining 15 day supply in bulk issue. Should one MEF deploy, the "out-the-door" blocks could be immediately issued to deploying units, with MedLog personnel following with the remaining bulk issue. Once the AMALs were issued, the MedLog companies could reconstitute an additional 30 day supply through the Prime Vendor. This would accomplish two immediate objectives: it builds up necessary supplies for rapid, continued support of deployed forces; and, it immediately prompts the pharmaceutical and medical/surgical industry to increase production capacity to meet potential surge demands. Should medical supplies be required for combat, military and commercial transportation assets can be used to move AMALs from other MedLog companies. It is important to note this is practiced on a smaller scale when shortages force MedLog companies to request contingency support from their counterparts in other MEFs. Even without dipping into another MEF's "out-the-door" AMALs, there is a total of 60 days of supply available through this means, not including the supplies available on the MPF ships or in NALMEB stocks. The MedLog company(ies) that provided the added requirement could, through their regional Prime Vendor, reconstitute their own bulk AMALs paid for with contingency funding or fund redistribution from the deploying MEF. Since the AMALs/ADALs are based on casualties treated, determining the cost of

reduced requirements is simply a matter of halving the previous values, listed in Table 2. Table 4 shows the new total value of maintaining 30 DOS of AMALs and the reduced average estimated replacement cost for this alternative. Each MEF would thus save up to \$1.2 million annually, for a total AMAL maintenance cost savings of \$3.6 million. With the Prime Vendor Program another \$540,000 would be saved. If the Prime Vendor were to supply bar code scanning equipment, the total savings to the Marine Corps would be at least \$4.3 million a year.

Total Value of AMALs Maintained (for 30 DOS)	\$3,642,051
Est Avg Annual Replacement Cost (for 30 DOS)	\$1,214,017

Table 4. Value and Replacement Costs for 30 DOS of AMALs

2. Maintaining the MedLog Infrastructure

A disadvantages of the Prime Vendor Program, identified in Chapter II, was reduction in the medical logistics training base. With fewer personnel involved in the ordering and maintenance process, fewer personnel are available to support deployed medical facilities. Consolidation of AMALs to one location further reduces this training base, placing a potential stumbling block in the way of deployment support. One advantage to merely reducing each MEF's supply to 30 days is it maintains sufficient quantities of MedLog personnel for each MEF to deploy. These personnel provide the link between deployed forces and the remain-behind MedLog assets. This insures that, once the medical elements establish operations in the combat theater, they will have the in-country support structure for rapid resupply of needed supplies and equipment. Additionally, it will insure enough remain-behind personnel familiar with MedLog operations are available to reconstitute the AMALs and support deployed MedLog personnel.

E. COMPLETE RELIANCE ON PRIME VENDOR SUPPORT

1. Eliminating AMAL Reserves

A more radical approach to providing contingency response is to eliminate the MedLog companies' entire consumable AMAL inventory, relying entirely on the Prime Vendor and industry to meet wartime demand. Due to their rapid response capability, maintaining the MPF squadrons would be essential for both American strategic mobility and its commitment to forward presence. Again, increasing the minimum MPF shelf-life requirement of 18 months is essential, otherwise some form of Fly-In Echelon stocks must be maintained. Using all three MPF squadrons gives a deploying Marine Corps MEF a 30-day supply of medical supplies after initiating ground action. DPSC could provide supplies for an additional 120 days of support. This would give 150 days for the Prime Vendor and industry to respond and provide continuing support. While Prime Vendor contracts specify a fill rate of 95 percent in 24 hours, it is questionable whether they could meet the deadline for all immediate deployment requirements. However, with 150 days of support already on hand there is little need to enforce the 24 hour contract deadline. Give them 90 days and there is still a 60 day safety window. Though the expense involved with emergency contracts can be great, according to GAO's August 1993 report DPSC spent \$257 million to meet all three services' emergency procurement during Operation Desert Shield, three months provides sufficient time for American and foreign industries to meet demand for all but the most military-unique items. DPSC could even write surge requirements into peacetime procurement contracts, thereby giving the pharmaceutical and medical/surgical industries financial incentive to maintain this capability. Unless world crises become routine, the cost savings for this alternative could well justify the added expense of emergency contracts, provided

the Marine Corps' cost share would be less than the eight million dollars currently required each year.

2. Maintaining Military Unique Items

One risk remaining in completely relying on Prime Vendor support is the relative scarcity of military-unique items. An August 1993 GAO study reported DPSC encountering problems in procuring military-unique medical supplies, especially "those with low peacetime demand but high wartime demand, those that are specific to the theater of operations, and those requiring a different strength dosage or method of administration than that used in civilian practice." (GAO, August 1993) The report went on to list four items for which DPSC had the most difficulty meeting demand throughout the Persian Gulf build up. These four were: (1) Mark I Nerve Agent Antidote Kit, (2) atropine injector (part of the Mark I Kit but also used individually), (3) pyridostigmine bromide tablets (pre-treatment for nerve gas), and (4) immune serum globulin (a vaccine to boost the immune system. Additionally, a 1988 National Defense University study identified potential problems in surge capability for the autoinjectors used in the Mark I Nerve Agent Antidote Kit. The autoinjectors represent perhaps the most military unique requirement. There is only one manufacturer, no commercial market, and they are only used during wars involving chemical or biological weapons. Since industry does not adequate production to support war time requirements for these items, some form of war reserve must be maintained.

3. Maintaining the MedLog Infrastructure

Eliminating the consumable AMAL reserves from each MEF, though financially sound, also eliminates the medical logistics personnel training base. If deploying medical units do not have personnel familiar with replenishing medical supplies, their level of medical support is effectively limited to the 30 days of

supply prepositioned on the MPF ships. Especially during the build up phase of combat operations, it is important to treat the wounded, evacuate those with severe injuries, and return to the battle as quickly as possible those still capable of performing their duties. If after these initial stocks are consumed it is impossible to do this, the military has failed in its mission to the country and to its personnel. Even with MedLog personnel maintaining each MEF's AMAL equipment blocks and support routine training exercises, complete reliance on the Prime Vendor would prove inefficient for maintaining this training base, making this alternative risky.

F. CONTRACTS WITH COMMERCIAL VENDORS

Where there is profit, there is someone willing to provide a service. The same could be true for the medical PWR business. Paying the Prime Vendor to perform the PWR mission is certainly an option open for medical planners. DPSC could contract with the Prime Vendor to maintain enough consumable items to meet specified wartime requirements. Additionally, the Prime Vendors would be responsible for associated redistribution and disposal costs for expiring items. Making a profit is critical in the private sector, and the Prime Vendor may devise more efficient methods to meet the Marine Corps' medical logistics requirements. One advantage Prime Vendors have is the assistance of the entire military and commercial hospital industry to rotate required medical supplies. Prime Vendors make their money by accurately forecasting demand and minimizing total inventory costs. By contracting with Prime Vendors to increase their inventory, the DoD would be providing financial incentive to the Prime Vendor to maintain additional stocks. As long as contracts are for an amount less than is currently wasted in replacement and disposal costs, there remains an advantage to this alternative. Unfortunately, as mentioned in the last section, the loss of the medical logistics

training base severely affects war time support making this alternative equally risky.

G. CONCLUSIONS

The threat of global war once forced the DoD to maintain enough reserves to sustain all military forces for six months, giving industry time enough to surge production. We now face limited conflicts where only a necessary fraction of our force will be employed and we have a robust industry to support it. The Prime Vendor Program, a new addition to our deployment response, provides an opportunity to streamline our medical war reserve mission. With the exception of certain military-unique pharmaceutical and medical/surgical supplies, there is no need to maintain the current level of AMALs. Minimizing costs, however, is only one factor in deciding how much reserve to maintain. The ability to wage war involves more than drawing from critical reserves. It also requires maintaining the personnel necessary to provide continued medical support. The Marine Corps must maintain the medical logistics infrastructure to support deployed medical units. With military treatment facilities reducing the number of personnel assigned to this mission, the medical logistics companies will become the principal source of this critical war reserve.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Maintaining prepositioned war reserve AMALs is a costly undertaking. Due to their dated and deteriorative nature, maintaining these reserves requires continuous monitoring and replacement of expiring supplies. Their life-saving function, however, makes maintaining them a serious responsibility. Deciding to reduce stocks now could result in unnecessary loss of life later. No medical logistician will knowingly allow survival rates to drop as a result of reduced materiel support while the potential exists to provide the necessary supplies and services. Accordingly, senior medical logistics planners are reluctant to reduce war reserve quantities. With declining defense budgets, decisions are constantly being made at lower levels to reduce medical reserves, keeping AMALs below maximum readiness. As discussed in Chapter III, the end of the Cold War has greatly reduced the risk of global war. At some point, the Marine Corps must realize current stock levels are far greater than now required. Each MEF's medical reserves should not be considered reserved solely for that MEF's potential requirements. These supplies can be redistributed anywhere in the world to support a contingency, regardless of the service involved. The Prime Vendor can reconstitute the reserves before the nation's strategic lift can deploy all the necessary contingency forces. DPSC continues to maintain 120 days of war reserves, and are well prepared to use military airlift and the commercial transportation industry to fulfill their mission of supporting deployed forces. Given the greatly reduced force requirements, the pharmaceutical and medical/surgical supply industries are capable of meeting demand for all but the most military-unique medical requirements during war.

The AMAL concept is still a viable system for providing deployed and deploying personnel with a standard medical supply block, and maintaining 30 DOS at each MEF should remain a priority. However, maintaining 60 DOS in a constant state of readiness for three MEFs is a practice designed during a gloomy period in our nation's history. Global war was around every corner and the commercial medical/pharmaceutical and transportation industries were too small to provide timely surge capability. It is time the Marine Corps stopped relying on a system designed in the past, and put faith in technological and commercial advances in both production and transportation.

Chapter II discussed successes achieved by military treatment facilities in adopting commercial medical resupply practices. The Prime Vendor is the ideal partner for the military medical logistics system, providing rapid response that easily adapts to outfitting deploying unit medical requirements. A nation-wide network and close relationships with manufacturers produce an incredible response capability. The Prime Vendor has already proven its worth in a contingency by filling over 90 percent of the AMAL requirements for the USNS Comfort during Operation Restore Democracy in Haiti. Were the contracts to so specify, Prime Vendors could meet the requirements for much larger deployments as well.

B. RECOMMENDATIONS

1. Adopt the Prime Vendor Program

The Marine Corps should adopt the Prime Vendor Program for all their medical logistics requirements. Using this as their primary source of supply, with the Prime Vendor supported bar code scanning devices, software and training, will provide significant savings. As discussed in Chapter IV, each MEF will save a minimum of approximately \$411,000 annually (\$350,000 from Prime Vendor plus \$61,000 in bar code efficiency). Between the Maritime Prepositioning Force and

the Norway Air Landed MEB, a savings of \$279,000 can be achieved, for a total savings to the Marine Corps of over \$1.5 million annually.

An additional savings can be achieved through obtaining supplies with longer remaining shelf-lives through the Prime Vendor. DPSC does not always provide each medical logistics company with their highest remaining shelf-life items. Every month lost on shelf-life means the MedLog companies have to replace a perishable item more often. With the Prime Vendor Program, the MedLog companies would receive the items almost direct from the manufacturer's assembly line. In the long run, this will reduce replacement, redistribution, and disposal costs, a potential savings of up to \$1.2 million per MEF per year.

If the Marine Corps takes advantage of the "return-for-credit" option available in the basic Prime Vendor Program, the MedLog companies' replacement and disposal costs would be virtually nonexistent. Due to the military-unique nature of many AMAL items, and the financial loss of purchasing and disposing of large quantities of unused medical waste, this option would require DPSC to negotiate new contracts with the Prime Vendors. Although prompt redistribution of widely used commercial items can prevent loss to the Prime Vendor, there would have to be some type of monetary compensation added to the current contracts to keep this option open for military-unique items. With annual costs exceeding eight million dollars for replacing and disposing of expired shelf-life items, the Marine Corps could apply this much to the contract and still reduce disposal costs and decrease short shelf-life replacements.

2. Reduce AMAL Requirements

The Marine Corps should reduce the AMAL requirements from a 60 day capability to 30 days of supply. There is tremendous redundancy in maintaining 60 days of AMAL for three MEFs when the biggest threat the U.S. expects to support is two major regional conflicts. Using the AMALs from the three MEFs,

the MPF, NALMEB stocks, and DPSC's medical reserves, there are sufficient reserves to support expected requirements. Strategic lift limits U.S. response to a contingency, but this lift can move the AMALs from any prepositioned location directly to the area of operations. If necessary, the nation's domestic transportation industry is well suited to meet war reserve redistribution requirements within the continental U.S. without utilizing strategic lift assets. The Prime Vendor relies on this same transportation industry to keep both commercial and MTF customers supplied and to reconstitute a MedLog company's issued reserves well before 180 days of reserves are expended. Savings to the Marine Corps, in conjunction with the Prime Vendor initiative mentioned above, equates to over \$4.5 million a year.

a. Meeting Mount-Out Requirements

Maintaining 30 days of supply at each MEF preserves two essential requirements of deploying forces. First and foremost it ensures forces have their necessary immunizations and mount-out issue when required to deploy. "All medical support elements of a MAGTF mount-out with equipment and medical consumable items sufficient for projected 15 days (minimum) of combat support operations." (FMFM 4-50) Current MedLog company stocking procedures have this supply on hand to issue when necessary; the remaining 45 days deploy in bulk with deploying MedLog personnel during the general unloading phase. Reducing the requirement to 30 days of supply maintains this "out-the-door" requirement, reducing the bulk supply from 45 days to 15 days. Each MEF could redistribute their 15 day bulk supplies to the area of operations, supporting a deployed MEF's requirements then immediately replenish their stocks from the Prime Vendor. The MedLog Company would also begin replenishing their reserves, giving the Prime Vendor at least 45 days from MEF activation before DPSC reserve would have to

be used. Considering the Prime Vendor contract requires over 95 percent fill rate in 72 hours, this provides considerable leeway for the Prime Vendor to respond.

b. Maintaining MedLog Training Base

Though requirements are reduced by half, maintaining AMALs in each MEF provides MedLog personnel trained in managing and handling medical supplies. As MTFs reduce the number of personnel in their medical logistics billets, the number of corpsmen familiar with this critical activity diminishes. Rebuilding this capability in an austere combat zone would require an extensive retraining period, with commensurate mistakes and delays. The magnitude and urgency of supporting medical requirements in a combat zone would prohibit such retraining. Maintaining 30 days of supply in each MedLog company, though perhaps not necessary to meet actual wartime medical requirements, does provide human resource capital to ensure the medical supplies flow into the area of operations and out to the remote medical units.

3. Increase MPF Minimum Shelf-Life Standard

Current MPF guidelines require a minimum 18 months shelf-life remaining on dated and deteriorative items to be placed on the ships during their 30-month cycle. This requires the deploying MEF to "fly-in" replacement items if the ship has been out of Blount Island for over 18 months. The longer the MPF ship has been out of port, the more items needing replacement. Though considered a rational requirement under previous practices, it is reasonable to expect longer minimum shelf-lives through the Prime Vendor Program. The MPF program was designed to rapidly project combat power into an area using the minimal amount of airlift. If I MEF were to respond to a contingency in January of 1995, it would have to replace \$600,000 worth of expired stock on its supporting MPF Squadron. This additional airlift burden taxes an already limited strategic airlift capability

which could hinder movement of critical personnel and equipment during a critical phase of the deployment cycle. (Menarchik, 1993)

C. RECOMMENDATIONS FOR FURTHER STUDY

1. Military Unique Items

This thesis identified four military-unique pharmaceutical items, plus the autoinjectors suited only to chemical warfare concerns, that DPSC had particular difficulty obtaining during Operation Desert Shield. Given their unique nature, the Prime Vendor and industry may not be able to rapidly respond for a major deployment. The Defense Medical Standardization Board (DMSB) has compiled a list of non-equipment medically significant items ranging from aspirin to zinc consisting of only dated and deteriorative medical items. This D-Day Significant Item List aids medical planners to identify and select which items must be maintained in war reserves for any given contingency response. Changes to this list require medical experts from the three services to reach a consensus on which items are truly needed for responding to world crises. A comprehensive review of this list, using Prime Vendor response rates and industrial preparedness plans, should be accomplished to determine if the Prime Vendor can support initial mount-out requirements. Eliminating Prime Vendor supportable items from this list will greatly reduce the steady financial drain of replacing items that industry can immediately provide.

2. Eliminate Medical Logistics Companies

Current directives prohibit expending PWR materials for other than combat support purposes. Equipment and consumable AMALs/ADALs may be used in conjunction with unit training efforts to enhance familiarization but the units that will use them do not maintain them. The medical logistics companies are

structured and tasked to provide a centralized supply facility for Class VII items and medical equipment repair/maintenance. In peacetime, they maintain all equipment and consumable AMALs and ADALs, issuing them only for requested training and contingency purposes. MedLog companies are not a medical/dental organization of the Fleet Marine Force; they perform their resupply and maintenance mission under the direction and guidance of the commanding officer of the supply battalions of the Force Service Support Groups.

Recent military reductions warrant studying the possibility of eliminating the medical logistics companies altogether. If the units using the AMALs in time of war have the responsibility of maintaining them during peace, they would have the opportunity to better familiarize themselves with the contents and operation of the respective AMALs. Every unit commander likes to know that every item necessary to support the unit is ready for deployment. They know how many HMMWVs are working, how much communications gear is operable, and how many weapons are in prime condition. With the current AMAL system, however, their medical requirements are not filled until days before their deployment, giving them no time to fix discrepancies or augment the mandated quantities. In many cases their medical personnel, since they order routine requirements through the standard supply system, are not familiar with what is in each AMAL. This provides an unnecessary disservice to a unit readying itself for war. Transferring ownership of AMALs/ADALs to authorized units carries the obligation and responsibility to maintain them in a combat ready status. Though this would require redistributing the current balance of funds throughout the MEF, commanders will know their units have the medical support necessary to support operations well before they are needed in actual combat. The Medical Battalions, after transferring the MedLog Companies' medical logistics section to their Headquarters and Service Company, could fill the combat medical resupply

function during deployments. Additionally, since these battalions own the majority of medical equipment during wartime, they would become the centralized repair site for medical equipment. For units remote from their location, contact teams could be dispatched for this purpose.

APPENDIX A. AUTHORIZED MEDICAL/DENTAL ALLOWANCE LIST

Fleet Marine Force AMAL/ADALs are arranged in a modular concept. The equipment module contains equipment and reusable materiel required to establish the basic function of the module (e.g., operating room). The supply module contains consumable materiel designed to support the function in the treatment of a designated number of casualties or to perform a specific task (e.g., operating room supplies). For readiness purposes, an equipment module may be stored in combination with its corresponding supply module. The materiel listed in each AMAL/ADAL is the minimum amount to be maintained. (FMFM 4-50)

Each Marine Expeditionary Force are required to maintain sufficient AMAL/ADAL quantities to provide 60 days of capability. New casualty rates have been established, estimate to be 8,381 personnel per MEF for a 60 day period, with a maximum sustained rate of 195 casualties per day. This new casualty rate should reduce Class VIII war reserve consumable density requirements by 58 percent over the previous estimates. The following pages describe and list the AMALs each MEF is required to maintain based on these new estimates.

AMAL 618 - Laboratory Equipment: Equipment and reusable material required to establish a laboratory capable of hematology, microbiology, urinalysis, and chemistry. Number per MEF: 18.

AMAL 619 - Laboratory Supply: Consumable supplies required to perform hematology, microbiology, urinalysis, and chemistry testing for 100 patients. Number per MEF: 101.

AMAL 621 - Blood Bank Equipment: Equipment and reusable material required to establish a blood bank to support an emergency blood collection capability, monitored mechanical refrigerated storage for 120 units of whole blood and cross-matching of blood. Number per MEF: 10.

AMAL 624 - Blood Bank Supply: Consumable supplies required to perform collection of 48 units of whole blood and to perform 200 cross-matches. Number per MEF: 103.

AMAL 627 - X-Ray Equipment: Equipment and reusable material required to establish one x-ray room and processing facility. Number per MEF: 18.

AMAL 649 - Laboratory Supply: Consumable supplies required to provide x-ray support for 100 patients at 10 films per patient. Number per MEF: 102.

AMAL 629 - Pharmacy Equipment: Equipment and reusable material required to establish a pharmacy. Number per MEF: 18.

AMAL 630 - Pharmacy Supply: Consumable supplies required to provide pharmacy support to 1,000 persons for 30 days. Number per MEF: 50.

AMAL 631 - Shock Surgical Team/Triage Equipment: Equipment and reusable material required to establish a basic shock surgical team or triage to support the receipt, resuscitation, sorting, and temporary holding of major casualties. Number per MEF: 12.

AMAL 632 - Shock Surgical Team/Triage Supply: Consumable supplies required to receive, resuscitate, sort, and temporarily hold 50 casualties with major wounds. Number per MEF: 150.

AMAL 633 - Acute Care Ward Equipment: Equipment and reusable material required to establish a 20 bed unit providing care for patients. Number per MEF: 27.

AMAL 634 - Acute Care Ward Supply: Consumable supplies required to provide ward support for 100 patient days. Number per MEF: 215.

AMAL 635 - Aid Station Equipment: Equipment and reusable material required to support one medical officer in an aid station environment. Number per MEF: 82 (One per division, wing, group aid station and engineer battalion aid station table of organization (T/O) medical officer.)

AMAL 636 - Aid Station Supply: Consumable supplies required to provide aid station support, initial resuscitative, and stabilizing care for 50 casualties with major wounds prior to evacuation. Number per MEF: 168.

AMAL 637 - Preventive Medicine Equipment: Equipment and reusable material required to establish a preventive medicine section providing technical preventive medicine advice, and inspection of food service operations, waste disposal, water potability and sources, vector control, and coordination of control measures required for communicable diseases, and monitoring and assisting in immunization programs. Number per MEF: 3.

AMAL 638 - Preventive Medicine Supply: Consumable supplies required to support of the preventive medicine effort of the MEF for 60 days. Number per MEF: 3.

AMAL 639 - Operating Room Equipment: Equipment and reusable material required to establish one operating room for performance of major surgical procedures, administration of general anesthesia, sterilization and maintenance of sterile material. Number per MEF: 18.

AMAL 640 - Operating Room Supply: Consumable supplies required to provide operating room support for 25 surgical cases. Number per MEF: 131.

AMAL 699 - Sick Call: Minimum equipment and supplies to augment the unit-held operating stocks of the sick call section of a unit's aid station. This AMAL is not considered PWR, and is free of all PWR restrictions. It is authorized for use in routine training exercises and for treatment of sick call patients. Number per MEF: 60.

APPENDIX B. MARITIME PREPOSITIONING FORCE COMPOSITION

The Marine Corps maintains three squadrons in their Maritime Prepositioning Force. The squadrons, and the MEF they are assigned to support during contingencies, are listed below.

MPS 1 (supports II MEF out of Camp Lejeune, NC)

MV KOCAL

MV OBREGON

MV BOBO

MV PLESS

MPS 2 (supports I MEF out of Camp Pendleton, CA)

MV HAUGE

MV BAUGH

MV ANDERSON**

MV BONNYMAN**

MV PHILLIPS**

MPS 3 (supports III MEF out of Okinawa, Japan)

MV WILLIAMS

MV LOPEZ

MV LUMMUS**

MV BUTTON

All ships were downloaded during Operations Desert Shield and Desert Storm. Ships marked with a double asterisk (**) were selectively downloaded in Somalia in support of Operation Restore Hope.

APPENDIX C. PRIME VENDOR SUPPORTED MEDICAL SUPPLIES

As of mid-September of 1994, approximately 22,700 pharmaceutical and 65,800 medical/surgical items were available through the Prime Vendor Program. All military supplies are assigned a National Stock Number (NSN) and medical supplies are no exception. The first four digits of the NSN are the Federal Supply Codes. The Federal Supply Codes supported by the Prime Vendor Program are listed below.

PHARMACEUTICALS

- FSC 6505 Drugs, Biologicals, and Official Reagents
- FSC 6508 Medicated Cosmetics and Toiletries
- FSC 6550 In Vitro Diagnostic Substances, Reagents, Test Kits,
 and Sets

MEDICAL/SURGICAL SUPPLIES

- FSC 6510 Surgical Dressing Material
- FSC 6515 Medical/Surgical Products and Hand-Held Surgical
 Instruments
- FSC 6530 Hospital Supplies
- FSC 6532 Hospital and Surgical Clothing
- FSC 6540 Ophthalmic Supplies
- FSC 6630 Chemical Analysis Instruments
- FSC 6640 Laboratory Supplies

APPENDIX D. GLOSSARY

AAC	Acquisition Advice Code
ADAL	Authorized Dental Allowance List
AMAL	Authorized Medical Allowance List
APF	Afloat Prepositioning Force
BUMED	Bureau of Medicine and Surgery, United States Navy
CJCS	Chairman, Joint Chiefs of Staff
CMC	Commandant of the Marine Corps
CRAF	Civil Reserve Air Fleet
DAPA	Distribution and Pricing Agreement
DDSIL	D-Day Significant Items List
DepMeds	Deployable Medical Systems
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DMRD	Defense Management Review Decision
DMSB	Defense Medical Standardization Board
DoD	Department of Defense
DOS	Days of Supply
DPSC	Defense Personnel Support Center
DRMO	Defense Reutilization and Marketing Office
EDI	Electronic Data Interchange
FIE	Fly-In Echelon
FMFM	Fleet Marine Force Manual
FMFRP	Fleet Marine Force Reference Publication
FSC	Federal Stock Code
FSS	Federal Supply Schedules
GAO	United States General Accounting Office

HMMWV	High Mobility Multi-purpose Wheeled Vehicle
IG	Inspector General
MAGTF	Marine Air-Ground Task Force
MCO	Marine Corps Order
MEB	Marine Expeditionary Brigade
MedLog	Medical Logistics
MPF	Maritime Prepositioning Force
MPS	Maritime Prepositioning Squadron
MRC	Major Regional Conflict
MTF	Military Treatment Facility
MV	Motor Vessel
NALMEB	Norway Airlanded MEB
NDRF	National Defense Reserve Fleet
NSN	National Stock Number
O/R	Operating Room
OSD	Office of the Secretary of Defense
OTD	Out-The-Door
PWR	Prepositioned War Reserve
SASSY	Supported Activities Supply System
SMU	SASSY Management Unit
SOP	Standing Operating Procedures
USAMMCE	United States Medical Material Command, Europe
UMMIPS	Uniform Material Movement and Issue Priority System
USNS	United States Naval Ship

LIST OF REFERENCES

Aguigam, Elmer J.A., *Inventory Management of Pharmaceuticals in Authorized Medical/Dental Allowance Lists*, Master's Thesis, Naval Postgraduate School, Monterey, CA, December, 1991.

Aspin, Les, *The Bottom-Up Review: Forces For a New Era*, Department of Defense, Washington, D.C., September 1, 1993.

Ballou, Ronald H., *Business Logistics Management*, 3rd ed., Englewood Cliffs, NJ: Prentice Hall, 1992.

Bird, Sara M., "Prescription for Change," *Army Logistician*, vol. 25, no. 6, pp. 18-20, Fort Lee, VA, 1993.

Chairman of the Joint Chiefs of Staff, "Roles, Missions and Functions Of the Armed Forces," *Defense Issues*, vol. 8, no. 4, February, 1993.

Clayton, William T., "Prime Vendor" - DOD's Future Medical Supply System, Individual Study Project, U.S. Army War College, Carlisle, PA, April, 1993.

Clinton, William J., *A National Security Strategy of Engagement and Enlargement*, The White House, July, 1994.

Cuddy, John J., et al. *The capability of the Health Care Industry to Support Department of Defense Mobilization Requirements*, Industrial College of the Armed Forces, National Defense University, Washington, D.C., 1987.

Department of Defense, *Conduct of the Persian Gulf Conflict. An Interim Report to Congress*, U.S. Government Printing Office, Washington, D.C., July, 1991.

Department of Defense, Office of the Assistant Secretary of Defense Health Affairs, *Medical Readiness Strategic Plan, 2001*, Washington, D.C., 1994.

Department of the Navy, BUMED Instruction 6710.62A, *Management and Disposal of Dated Medical and Dental Materiel*, Bureau of Medicine and Surgery, Washington, D.C., 31 Oct 1990.

Department of the Navy, *BUMED Customer Activity Standard Operating Procedures (SOPs) Guide in Implementing Defense Personnel Support Center and Department of Veterans Administration Prime Vendor Program for Pharmaceuticals and Medical/Surgical Supplies*, Bureau of Medicine and Surgery, Washington, D.C., 1993.

Defense Information Systems Agency, *Prime Vendor Evaluation*, Washington, D.C., June, 1994.

Defense Medical Systems Support Center, *Prime Vendor Implementation Guidelines (Draft Version 2.0)*, April, 1994.

Gourdin, K.N., and Trempe, LTC R.E., "Contingency Transportations in a Changing World: Meeting the Challenge," *Logistics Spectrum*, vol. 26, iss. 1, Hyattsville, MD, 1994.

Hayes, Maj Mark L., *Sealift: The Achilles' Heel of our National Strategy*, "Marine Corps Gazette", vol. 76, no. 11, pp. 71-80, Quantico, VA, 1992.

Heizer, Jay H., and Render, Barry, *Production and Operations Management*, 3rd ed., Needham Heights, MA: Allyn and Bacon, 1993.

Hogberg, James A., and Stone, Shimone, *Humanitarian Assistance: Adapting the Process to Meet the Military's Evolving Role in Non-Traditional Missions*, Master's Thesis, Naval Postgraduate School, Monterey, CA, December, 1993.

Inspector General, Department of Defense, *Report on the Audit of Medical Supply Support in the Pacific (Project No. 5FV-074)*, Arlington, VA, July 23, 1986.

Joseph, Dr. Stephen C., "Military Health Care Must Be Ready, Accessible," *Defense Issues*, vol. 9, no. 31, Apr 14, 1994.

Keegan, John, *The Face of Battle*, Suffolk, Great Britain: Penguin Books, 1976.

Kinney, Bill C., and Symonds, Stephen B., *Just-in-Time Inventory Management: Applications and Recommendations for Naval Hospital, Oakland*, Master's Thesis, Naval Postgraduate School, Monterey, CA, December, 1992.

Laurea, Lena, "War Reserves - Key to Sustainability," *Army Logistician*, vol 17, no. 4, pp. 2-5, Fort Lee, VA, 1985.

Libicki, Martin C., *Industrial Strength Defense, A Disquisition on Manufacturing, Surge and War*, Mobilization Concepts Development Center, National Defense University, Washington, D.C., 1988.

Linville, Ray P., "Inventory Management: Improving Customer Service," *Logistics Spectrum*, vol. 28, iss. 3, pp. 30-33, Hyattsville, MD, 1994.

Mazarr, Michael J., *The Military Technical Revolution: A Structural Framework/Final Report of the CSIS Study Group on the MTR*, Washington, D.C.: Center for Strategic and International Studies, March 1993.

Maze, Rick, "Trading Military for Civilians?," *Navy Times*, November 7, 1994.

Menarchik, Douglas, *Powerlift - Getting to Desert Storm: Strategic Transportation and Strategy in the New World Order*, Westport, CT, Praeger, 1993.

Morales, Diane K., "Reshaping Defense Logistics," *Defense Issues*, vol. 7, no. 37, June 18, 1992.

Packard, David, *Management of America's National Defense*, Washington, D.C.: American Enterprise Institute, 1987.

Power, Nathan J., "Reconstitution," *Army Logistician*, vol. 23, no. 6, 1992.

Preston, Colleen, "DoD's New Strategy For Acquisition Reform," *Defense Issues*, vol. 8, no. 48, June 28, 1993.

Richanbach, Paul H., and Bicksler, Barbara, *Industrial Surge and Force Sustainability*, Institute for Defense Analyses, Alexandria, VA, November, 1986.

Scott, Janny, "From Depot in Germany, a Shot in Arm for GIs," *Los Angeles Times*, 19 February 1991, Sec. A, p. 8, col. 3.

Spring, Baker, "Supporting the Force: The Industrial Base and Defense Conversion," *The Heritage Foundation Backgrounder*, The Heritage Foundation, Washington, D.C., October 22, 1993.

Tackitt, R. D., *Prime Vendor Initiative*, Pharmacy Leadership Conference, 26 Oct. 1992.

Thompson, Major General Julian, *The Lifeblood of War - Logistics in Armed Conflict*, B.P.C.C. Wheatons Ltd., Exeter, London, U.K., 1991.

United States General Accounting Office, *DOD Medical Inventory: Reductions Can Be Made Through the Use of Commercial Practices*, Washington, D.C., December, 1991.

United States General Accounting Office, *Military Afloat Prepositioning: Wartime Use and Issues for the Future*, Washington, D.C., November, 1992.

United States General Accounting Office, *Operation Desert Storm, Improvements Required in the Navy's Wartime Medical Care Program*, Washington, D.C., July, 1993.

United States General Accounting Office, *Operation Desert Storm, Army Medical Supply Issues*, Washington, D.C., August, 1993.

United States General Accounting Office, *Defense Transportation*, Washington, D.C., November, 1993.

United States Marine Corps, *Concepts & Issues 1994, Taking the Corps Into The 21st Century*, Washington, D.C., 1994.

United States Marine Corps, *Marine Corps Order 4400.16G. Uniform Materiel Movement and Issue Priority System*, 19 June 1985.

United States Marine Corps, *Marine Corps Order 6700.2D. Medical and Dental (Class VIII) Materiel for Support of the Fleet Marine Force*, 2 January 1991.

United States Marine Corps, *Fleet Marine Force Manual (FMFM) 4-50, Health Service Support*, 19 September 1990.

United States Marine Corps, *Fleet Marine Force Reference Publication (FMFRP) 2-12, Marine Air-Ground Task Force: A Global Capability*, April 10, 1991.

United States Marine Corps, *CMC WASHINGTON DC 160101Z SEP 92 Subj: Class VIII Prepositioned War Reserve Materiel*, Commandant of the Marine Corps Code LPP, September, 1992.

United States Marine Corps, *CMC WASHINGTON DC 030104Z MAR 93 Subj: Authorized Medical and Dental Allowance List Density Reduction*, Commandant of the Marine Corps Code LP/MED/DEN, March, 1993.

Van Haute, Edward B., "Combat Service Support in Low-Intensity Conflict," *Marine Corps Gazette*, vol. 75, no. 4, April, 1991.

"McKesson Corporation Unit Contract," *The Wall Street Journal*, 10 February 1993, Sec. A, p. 4, col. 2.

Workman, Dale H., "The Case for Separate Medical Logistics Management," *Army Logistician*, vol 17, no. 4, pp. 2-5, Fort Lee, VA, 1985.

INITIAL DISTRIBUTION LIST

	No. Copies
1. Defense Technical Information Center Cameron Station Alexandria, Virginia 22304-6145	2
2. Library, Code 52 Naval Postgraduate School Monterey, California 93943-5101	2
3. Defense Logistics Studies Information Exchange U.S. Army Logistics Management College Fort Lee, Virginia 23801-6043	1
4. Director, Training and Education MCCDC, Code C46 1019 Elliot Road Quantico, Virginia 22134-5027	1
5. Professor Keebom Kang, Code SM/Kk Department of Systems Management Naval Postgraduate School Monterey, California 93943	1
6. Professor Paul J. Fields, Code SM/Fp Department of Systems Management Naval Postgraduate School Monterey, California 93943	1
7. Maj Stephen P. Dodd, USMC Executive Officer First Supply Battalion, First FSSG Camp Pendleton, California 92055	1

- | | | |
|---|---|---|
| 8 | LT Raymond J. Buyson, MSC, USN
Medical Logistics Company
First Supply Battalion, First FSSG
Camp Pendleton, California 92055 | 1 |
| 9 | Capt Kevin L. White, USMC
Marine Corps Systems Command
2033 Barnett Avenue
Quantico, Virginia 22134-5010 | 2 |

DUDLEY KNOX LIBRARY
NAVAL POSTGRADUATE SCHOOL
MONTEREY CA 93943-5101

Russell, Thomas W.

ID:32760003118241

W53265

Adopting the Prime Ve

White, Kevin L.

due:10/31/1996, 23:59

DUDLEY KNOX LIBRARY



3 2768 00311824 1